STEEL

The

Metalworking Weekly

NOVEMBER 14, 1960

A PENTON PUBLICATION

How the Machine Tool Industry In the Soviet Bloc Stacks Up

Don't Let Noise Pilfer Profits

How to Select Metal Abrasives

Tips for Getting Better Welds On Graphitic Tool Steels

Get More for Your Recruiting Dollar

James M. Osborne, manager of Ford Motor Co.'s college recruiting, outlines his firm's program. Starting salaries for graduates are going up, competition for accounting and liberal arts majors is getting keener. College placement directors say that more interest in small and medium sized firms is being shown by students. For tips on better recruiting, see Page 70

CONTENTS—TURN PAGE

NEW Model 322-A Bore-Matic

new industry-standard design provides

- ✓ HIGHER PRECISION
- ✓ EASIER SETUPS
- ✓ LOWER MAINTENANCE COSTS

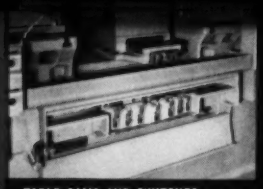
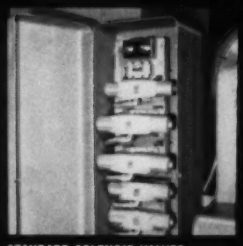
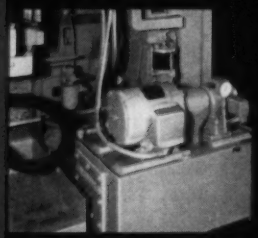


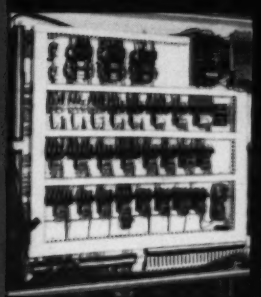
TABLE CAMS AND SWITCHES are enclosed for protection yet easily accessible for adjustment.



STANDARD SOLENOID VALVES are externally mounted, oil immersed and individually replaceable.



EXTERNAL HYDRAULIC POWER UNIT keeps accuracy-destroying heat out of the base, is readily accessible and isolates pump and motor vibration from the machine.



ELECTRICAL CONTROLS are centralized in an easily accessible dust-tight cabinet at the rear of the machine.

Completely new from base to bridge, this double-end Bore-Matic meets all JIC standards—gives you new precision and economy for high production Borizing of medium to large size work.

Hydraulic valves and power unit are outside of the base, preventing thermal distortion, providing maximum accessibility and contributing to sustained high precision. Control valves, mounted on hydraulic manifold plates at each end of the machine, are of standard, interchangeable design, easily accessible and individually replaceable. Bridge setbacks are infinitely adjustable on slotted pads, permitting optimum relationship between work and tooling. And a full-length table pad increases the capacity of the machine.

For complete information on all the time-saving, labor-saving features of this versatile new machine, just call your Heald engineer, or send for Bulletin No: 2-322A.

PRECISION ROTARY INDEXING FIXTURE.

Shown on the machine above is a new electronically-controlled rotary indexing fixture, adjustable for any desired number of equally-spaced indexes from 4 to 500,000, permitting precision drilling or boring of accurately-spaced holes on one or more bolt circles. Holes with the same spacing are Borized in a fully automatic cycle, resetting the controls only when spacing is changed.

It PAYS to come to Heald

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HEALD

This Week in STEEL

The Metalworking Weekly

November 14, 1960 Vol. 147 No.20

How Soviet Bloc's Machine Tool Industry Stacks Up

Machine tool builders behind the Iron Curtain are pushing hard to match output in the West. What will the impact of the Soviet Bloc mean to U. S. machine tool builders? You can get some idea from these Soviet figures: Expected exports of 15 to 20 per cent of output within five years. Annual production by 1965 of 190,000 to 200,000 metal cutting and 36,200 metal forming machine tools.

PAGE 67

Don't Let Noise Pilfer Profits

Industry is stepping up its policing efforts to prevent noise from "stealing" an estimated $2 million daily from its coffers. You can join in the campaign in any one or a combination of three ways: 1. Reduce the noise level at the source through machinery modification. 2. Isolate the source by enclosing it. 3. Absorb the reflected sound waves by using acoustically absorbent materials. For the complete story, see PAGE 77

How to Select Steel Abrasives

One of the most important factors in determining the cost and effectiveness of your blast cleaning, shot peening, or descaling operation lies in selection of the right steel abrasive. To make sure it is a refined, tempered martensite, microstructure should be checked (photo). Five other guideposts set up by J. R. McConnell, manager, Rotoblast Abrasives Div., Pangborn Corp., are presented in this article.

PAGE 114

How to Weld Graphitic Tool Steel

Users of graphitic tool steels benefit in three ways because of their weldability: 1. Frequent tool design changes are possible. 2. Errors in assembly and heat treatment can be rectified quickly. 3. Worn and broken dies can be repaired more easily than other types. Tips and recommendations are presented by tool steel and research metallurgists at Timken Roller Bearing Co.

PAGE 116

What's in the Future for Steel?

Metallurgists and research men attending the Metal Show in Philadelphia expect more progress in high strength steels, better fabrication properties, more air hardening tool steels, and higher strength in stainless grades. They also look for increased use of vacuum equipment and wider application of automatic controls.

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Grizzly feeder fabricated from steel plate handles 500 tons of slag per hour

Chief requirement for this 16-ton combination feeder-scalper is strength and high resistance to impact and abrasion. Manganese liners attached to steel bottom plates make it possible for this machine to withstand impacts from a 13-ft drop of 3-ft cubes from yard shovels. This unit will feed and scalp open-hearth slag and pit scrap at the rate of 500 tons per hour in a slag-reclaiming operation.

Bethlehem plates in thicknesses of ⅝-in. and 1½-in. were used to fabricate this machine at the Passaic, N. J., plant of Hewitt-Robbins, Inc. Deck supports are Bethlehem wide-flange sections.

The uniform quality of Bethlehem plates makes them ideal for weldments of any type. Bethlehem plates are available in a full range of sheared and universal mill sizes. For full details, call the nearest Bethlehem sales office.

Steel

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. . . Versatility

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Export Sales: Bethlehem Steel Export Corporation

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AMERICAN MONORAIL DOES IT!

20% SAVING IN LABOR

Lowering a partly assembled trailer top from an upright jig. Five hoists are used because some tops are made in 3 sections. This is a 44-ft. American Monorail crane. A 30-ft. crane and 150 feet of Monorail track also help speed production.

The following are direct statements made by an executive of Richardson Homes Corporation, world's 3rd largest mobile home builder at Elkhart, Indiana.

We chose the American Monorail System because they offered the best product at the least possible cost, plus the finest engineering service available.

"We have been able to realize a 20% cut in labor costs . . . The Monorail system eliminated 16 hard laboring jobs—4 in each of 4 departments.

"Production has increased at least 20% because of our Monorail and we have virtually eliminated backsprains and accidents that used to be prevalent."

AMERICAN MONORAIL

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Three Wean Electrolytic Tinning Lines produce high-quality tin plate at J&L

The No. 3 electrolytic tinning line at Jones & Laughlin's Aliquippa Works illustrated is one of three Wean lines installed by Jones & Laughlin Steel Corp. to meet the growing demand for high-quality tin plate.

Employing the horizontal acid (Halogen) plating process and induction reflow brightening, this line is capable of producing tin plate at speeds up to 2000 fpm. It can handle 40,000 lb coils up to 70″ O.D. with a maximum width of 42″. The line equipment is designed to process a range of gauges from .0055″ to .025″.

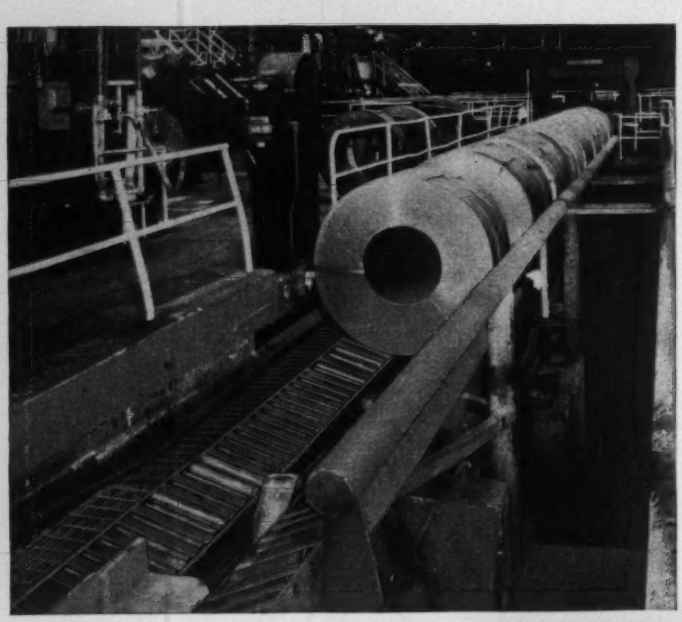
J & L's three Wean tinning lines are testimony to Wean's contributions to electrolytic tinning technology since the installation of the first commercial line 18 years ago. Wean "creative engineering" has accounted for 52 of the electrolytic tinning lines designed to serve markets around the world. We invite you to use this experience on the next expansion or modernization of your tin plate facilities.

WEAN

THE WEAN ENGINEERING COMPANY, INC. • WARREN, OHIO

MATHEWS CONVEYERS-

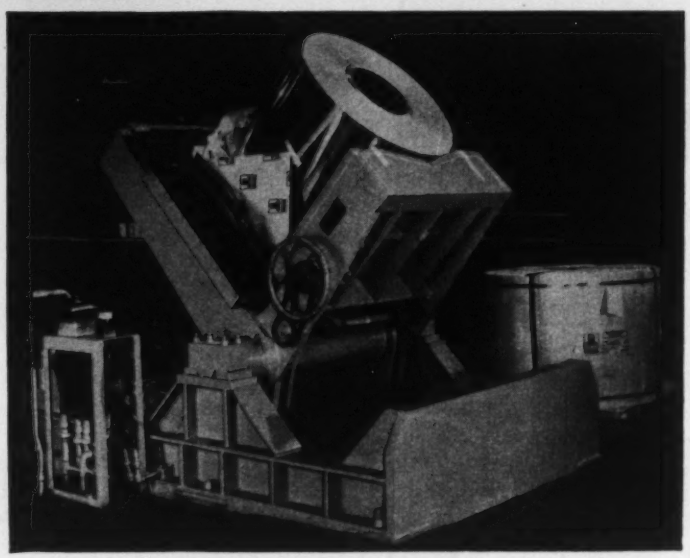
ENGINEERED TO DELIVER OUTSTANDING PERFORMANCE AT



J&L STEEL

At Jones & Laughlin's modern Aliquippa Works, Mathews Pallet Conveyers and Belt Conveyers are helping to create a continuous flow of materials in their new electroweld department. Like all Mathews equipment for the steel industry, these conveyers are built to deliver outstanding performance.

• A 71-foot-long Reciprocating Beam Conveyer designed to handle 36,000-pound coils at the entry end of mill.
(Photo courtesy Aetna-Standard Division, Blaw-Knox Company.)



• Upender handling 20,000-pound tin plate coils. This unit is loaded by ram tractor and unloaded by fork tractor.

MATHEWS CONVEYER COMPANY

GENERAL OFFICES . . . . . ELLWOOD CITY, PENNSYLVANIA
PACIFIC COAST DIV. . . . MATHEWS CONVEYER COMPANY WEST COAST, SAN CARLOS, CALIFORNIA
CANADIAN DIVISION . MATHEWS CONVEYER COMPANY, LTD., PORT HOPE, ONTARIO.

MCC MATHEWS

Over Fifty Years of Leadership in Mechanized Handling

Engineer Nets $1000 Via Usership

The judges in our Usership Idea of the Month Contests are thinking about striking a "Brinksmanship" medal for Ernest J. Hills, winner of the February contest. After collecting $500, Mr. Hills was notified that he had six months to earn another $500 by proving he had accomplished his objective. Five months and 29 days later, the proof arrived at STEEL's offices.

Mr. Hills is a senior engineer in the Conversion Tube Development Shop, Electron Tube Div., Radio Corp. of America, Lancaster, Pa. Information about superalloy spring wires in an article and three advertisements in our February issues started him on the route to licking a real cost problem. (STEEL, Apr. 25, p. 5.) In RCA's Super Power Tubes, used for long distance radar and missile work, are 96 filament coil springs made from special high speed steel. Processing brought the cost of each of the parts to more than $5; worth almost as much as their weight in gold. Mr. Hills investigated and tested many superalloy materials. Result: A second $500.

Lab Report Tells the Tale

". . . The objective was to find a material which would fulfill the functional demands at a fraction of the present cost; as many as 96 coil springs for filament tension are used in a tube.

"Several batches of spring samples were made from Elgiloy. Optimum heat treatments were developed. Desired final dimensions were obtained experimentally by varying winding specifications.

"Repeated 'hot' setting in vacuum at 662 and 752° F for 8 hour periods, under full load, showed no applicable (sic) loss of performance.

"It is concluded that springs made from Elgiloy are at least equal in performance, easier to wind, more uniform in dimensions, and estimated to eliminate 80 per cent of the manufacturing cost. Several of these test springs were installed in a tube which has been test run over 1000 hours . . . without indication of breakdown.

"Additional sample batches will be tested for final performance evaluation."

$5500 Goes to Readers

So far, four of our seven top award winners have harvested $1000 apiece in STEEL's Usership contests. We expect to hear from others. In the meantime . . .

You Can Win $1000 This Month . . .

. . . in STEEL's Usership Idea of the Month Contest. Tell us, in 300 words or less, how you plan to USE an article or advertisement in this issue (or any other issue published this month—November, 1960) to help you accomplish an important personal or company objective. Be as specific as you can. If, in the opinion of the judges, yours is the best idea submitted—**you will win $500.**

There's more . . . you will win an additional $500 if you furnish written proof that you accomplished your objective. Proof must be submitted within six months after you are declared winner of STEEL's Usership Idea of the Month award.

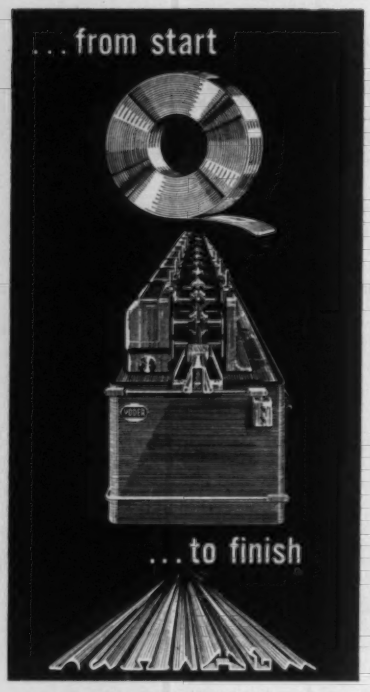
Please identify your letters as Usership entries. They will be judged by a committee of STEEL's editors. All letters become STEEL's property.

You can enter as many times as you wish. Send your entries to me, Ed Service, Servicenter, STEEL, 1213 W. Third St., Cleveland 13, Ohio. **Deadline for this month's contest is Jan. 1, 1961.**

'We Never Get the Word' Dept.

Machine Tool Editor Bob Huber passes this one along as gospel.

A major producer of exotic materials recently announced that it could make one of its products "easily forgeable." The news excited the metallurgist of a large, independent forge plant. He queried the producer's chief metallurgist. The



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Experienced Yoder engineers will, without obligation, study your annual metal forming requirements. Many times they can point out that the installation of roll forming equipment would—even if operated only intermittently—soon justify its initial cost.

Send today for this comprehensive, 88-page illustrated text. It fully describes Cold Roll Forming Equipment, processes and products.

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ENGINEERING YODER MANUFACTURING
COLD ROLL FORMING MACHINES

answer: "That news was put out by our sales department. Frankly, they are way ahead of us technologically."

Designer's Note

In asking for a copy of the 1960 Metal Selector, Frank J. Dever, design engineer, Willamette Iron & Steel Co., Portland, Oreg., said: "Such a complete listing of metals, with direct reference to specific applications, is quite unusual. The Selector will be a valuable reference for any design engineer."

Extra Copies Available

For a free copy of the 1960 Metal Selector, write Editorial Service, STEEL, 1213 W. Third St., Cleveland 13, Ohio. For two to ten copies, the price is 25 cents a copy. A discount of 20 per cent will be given on larger quantities.

Put a Pro in Purchasing . . .

. . . is the theme of next week's Materials Efficiency article. Associate Editor George Howick outlines the article in four parts: 1. What is a professional in purchasing? 2. Where are pros found? 3. How are pros developed? 4. How can companies combat unethical practices in purchasing?

In interviews with leading purchasing officials, George learned there's a lot of soul searching in the field and much discussion about ways to eliminate kickbacks and other sharp practices. Corporate functions are being scrutinized. Congressional investigators are gathering dossiers on cases involving conflict of interest.

One possible result: The need for professionalism in purchasing may lead to certification of purchasing agents, with entrance requirements, testing, and evaluation of candidates handled by people in purchasing.

Services Rendered

Reprints of the Oct. 10 article, "Association Membership Can Pay Off," are being distributed to members by the Institute of Scrap Iron & Steel Inc., Washington. In commenting on the article, William N. Brinker, the institute's director of public relations said: ". . . It was a pleasure to run down the list of 'services most commonly offered by industry associations' . . . and note that this association provides its members all of the 16 listed—many of them in great depth. Thanks for an article of great value to those in the association field."

Fluid Power NEWS

REPORT NO. 11,805 CASTING FEEDS NOT AFFECTED BY LOAD VARIATIONS

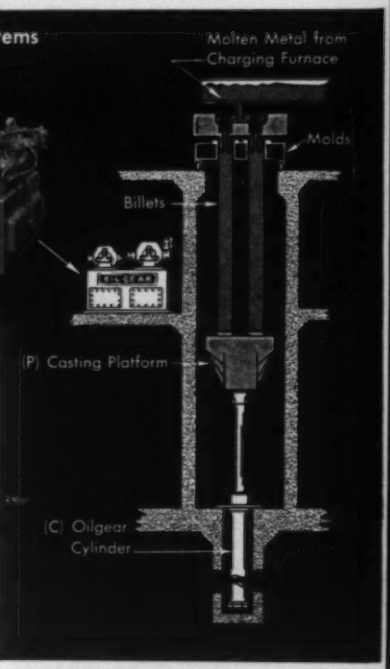
From Oilgear *Application-Engineering* Files

HOW OILGEAR SYSTEMS IN KAISER ALUMINUM PLANTS AID DIRECT CHILL BILLET CASTING PRODUCTION

USER: *Kaiser Aluminum & Chemical Corporation*

PROBLEM: To supply direct chill billet casting platform power and control systems for production of a major portion of the 1,050,000,000 lb of aluminum consumed annually by domestic extruders. Direct chill billet quality — avoidance of internal cracking, homogeneity, grain structure fineness and orientation — depends on a smooth, unvarying, precise platform feed rate, careful control of pouring speed and temperature, cooling rate, and other variables to prevent atmospheric oxidation and impurities. Up to 32 billet logs over 18 ft long are to be produced in a single cast. POWER AND CONTROL SYSTEM REQUIREMENTS: 1. Remote pushbutton control of all functions. 2. Rapid platform traverse up and down. 3. Infinite "down" feed rate selection — unvarying regardless of casting platform load increase; chatter-free — unaffected by off-balance platform loads. 4. "Fail-safe" — insuring completion of a cast in event of power failure. 5. Must be simple, and assure long, trouble-free, dependable service.

Application-Engineered Fluid Power Systems For Direct Chill Casting Stations



HOW IT WORKS: The Oilgear Variable Displacement Pump (1) on "Power-Pak" (A) provides adjustable preset slow and fast speeds for raising and lowering casting platform (P). Oilgear Variable Displacement Piston-type Precision Metering Pumps (2) are connected in series hydraulically between Oilgear Cylinder (C) and "Power-Pak" (A) Reservoir. Ram down-feed during casting is dependent upon control setting of the Secondary Metering Pump — remotely pushbutton-controlled to provide instant, precise, feed rate adjustment . . . indicated in ipm on a direct reading indicator. Oil, increasing in pressure as the billet load increases, flows from Cylinder (C) through sealed, "pressurized," Primary Metering Pump — and then, at relatively constant low pressure, through the Secondary Metering Pump to "Power-Pak" (A) Reservoir — providing an extremely accurate casting feed rate regardless of varying platform load. An automatic, Oilgear hydraulic control varies Primary Metering Pump displacement to compensate for load variation and feed rate selected. "Fail-safe" operation is provided through Oilgear Valves.

Above: Rapid traverse is used to raise the casting platform, bringing, in this case, the 6-in.-sq. by 18-ft billet logs out of the casting pit for identification with cast number at one of three direct chill casting stations at Kaiser Aluminum's Chalmette, La., Works. Direct chill "molds" are clearly visible behind the "marker."

SOLUTION: Oilgear's patented Feed and Control System provides accurate volumetric metering of pressurized oil over a 200:1 pressure range, and a 100:1 feed range. Installations consist of an Oilgear Variable Displacement Pump direct-connected to an electric drive motor, two Oilgear Precision Variable Displacement Metering Pumps direct-connected to a double-end synchronous electric motor — all mounted on a custom-built reservoir base (A); and Oilgear piston- and ram-guided, chatter-free, *Custom-Quality* Cylinder (C); Oilgear Valves and Controls . . . all thoroughly, carefully *Application-Engineered.*

USER REPORTS — "Where accumulating load on the platform varied oil pressure from 50 to 1500 psi, and the rate of metering was preset anywhere from 50 to max. cipm, *there was no measurable change on the preset rate of casting feed during any portion of the stroke.*"

There has been NO major maintenance on these heavy-duty Oilgear Systems operating continuously in Kaiser Aluminum plants across the nation — some for over 7 years — and still "going strong."

THIS PATENTED OILGEAR METHOD of precise metering — and other accurate Oilgear Control Systems — have been applied to a wide range of applications in many industries where varying loads must not affect the speed of linear movement or hydraulic motor rotation. Carefully Application-Engineered Oilgear Systems — also used extensively on extrusion presses . . . aluminum foil laminating machines . . . stretching, forming, drawing and spinning presses . . . can-closing and filling machines . . . metal briquetting presses . . . ladle tilting, ingot manipulators, strippers, and scalpers — have all proved Oilgear equipment's traditionally long life, prompting users to state —

"for the lowest cost per year . . . it's Oilgear!"

For similar practical solutions to YOUR linear or rotary motion problems, call the factory-trained Oilgear Application-Engineer in your vicinity. Or write, stating your specific requirements directly to . . .

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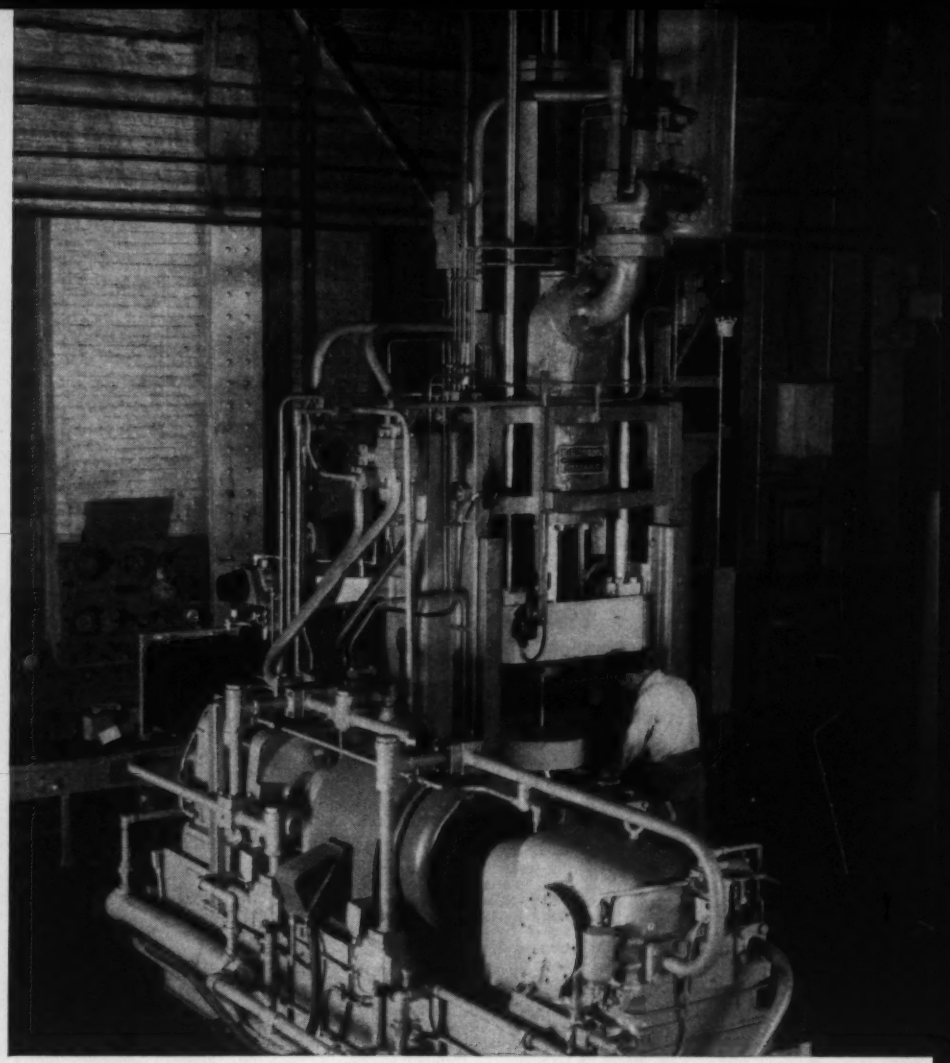
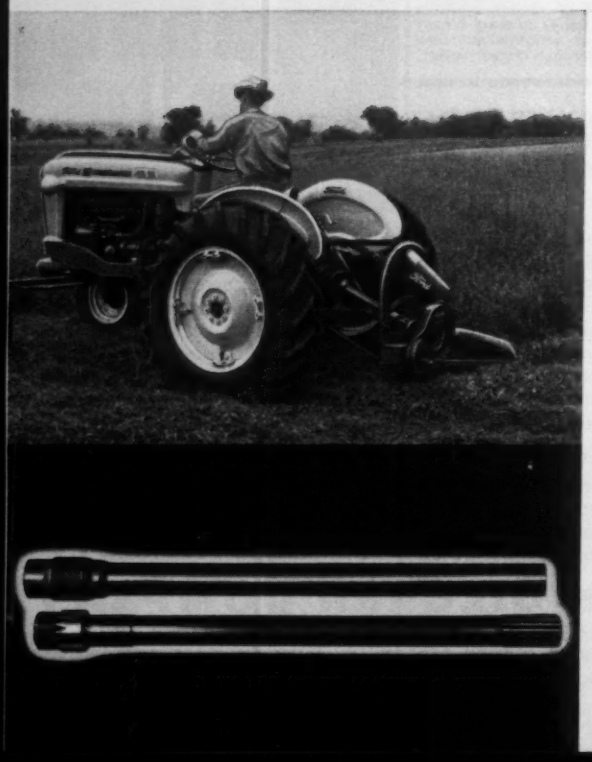


This 500-ton hydraulically operated press built by Birdsboro Steel Foundry & Machine Company, Birdsboro, Pa., and featuring Republic ELECTRUNITE Hydraulic Fluid Line Tubing, is used by a leading research center for deep drawing, extruding, or planishing metals.



REPUBLIC DIE-FORM CUTS PRODUCTION COSTS. Ford Tractor Power Take-Off Counter-Shaft costs less to produce using a Republic Die-Form Blank, as compared to previous materials. Because Republic Die-Form Blanks closely approximate the completed part, they minimize required machining and reduce handling costs. In addition, the nature of the Die-Form Process improves machinability of any given analysis, permitting further savings through use of higher speeds and feeds. Photo below shows a Die-Form Blank and the completed shaft as featured in the Ford Tractor. Write for Die-Form Folder ADV-746.

REPUBLIC CAP SCREWS PROTECT SHAKER SCREEN PERFORMANCE. Sorting and sizing ton after ton of jolting, jarring, abrasive material is all in a day's work for Ty-Rock Vibrating Screens, built by The W. S. Tyler Company, Cleveland, Ohio. Satisfactory performance under these brutal conditions not only requires design and manufacturing skill, but a thorough knowledge of materials. Maximum performance under all operating conditions is typical of Republic's complete line of top-quality Cap Screws. Send coupon for data.

Stubborn resistance to fatigue...

REPUBLIC ELECTRUNITE HYDRAULIC FLUID LINE TUBING

Machine tool builders and operators depend upon Republic ELECTRUNITE® Hydraulic Fluid Line Tubing for stubborn resistance to fatigue. Reason is the *consistent uniformity of concentricity* and mechanical properties of ELECTRUNITE welded steel tubing—characteristics that make this tube better able to withstand the vibrations of rapid multiple cycling.

This uniform concentricity—inherent in the ELECTRUNITE process—coupled with uniform heat treatment, insures uniform flaring characteristics. Uniform ductility assures easy bending. Both mean savings in original and in replacement installations.

You can recognize this best of all hydraulic line tubing by the blue spiral marking stenciled end-to-end on every length. It is your assurance of genuine ELECTRUNITE quality. The spiral marked tube is available in all sizes shown in JIC Standards, and is produced in a wider size range to Specification HL-1, which meets all JIC Standards test requirements.

Get all the facts. Discover how Republic ELECTRUNITE Hydraulic Fluid Line Tubing can substantially reduce maintenance costs in the most complicated installations. Call your Republic representative, or send coupon for additional information.

REPUBLIC WEDGE-LOCK PARTS STORAGE UNITS are easy to load and unload from either side. And, the heavier the load, the tighter the grip, because patented Wedge-Lock construction includes a post that will not buckle, a concealed sway-proof joint, and a reinforced shelf that does not sag. Unlimited shelf arrangements. Capable of exceptionally high stacking. Republic Storage Engineering specialists will help you plan. Call your Republic representative today.

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☐ Republic Cap Screws ☐ Wedge-Lock Storage Units

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Firm_____

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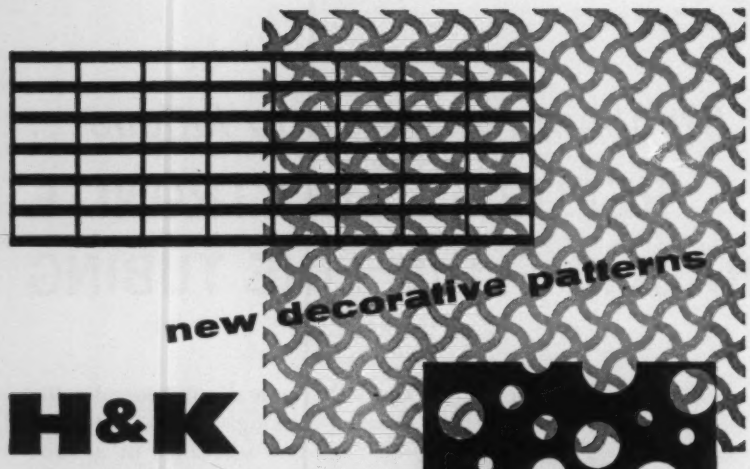
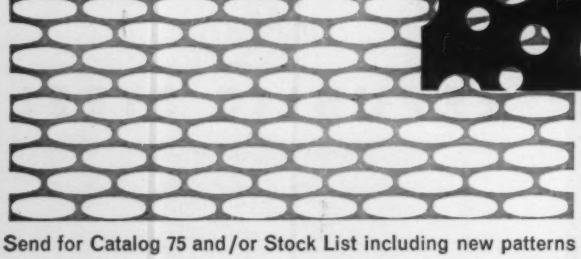


H&K
perforated materials

Passage or control of air, sound, light or fluid . . . decorative concealment . . . component protection . . . eye catching, sales-building beauty—if your product requires any or *all* of these features, you'll find the design and functional versatility you need in the Harrington & King line of perforated materials. Just four of H & K's new patterns are illustrated here. There are many more contemporary and traditional designs, all available in steel sheets for shipment from stock.

And there is also a vast selection of additional patterns and open areas which can be custom fabricated from existing dies. H & K can perforate practically any material. May we put our more than 75 years of experience to work for you?



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CALENDAR
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Nov. 14-18, American Society of Tool Engineers: Western tool show, Memorial Sports Arena and Ambassador Hotel, Los Angeles. Society's address: 10700 Puritan Ave., Detroit 38, Mich. Executive secretary: Harry E. Conrad.

Nov. 14-18, National Electrical Manufacturers Association: Annual meeting, Traymore Hotel, Atlantic City, N. J. Association's address: 155 E. 44th St., New York 17, N. Y. Managing director: Joseph F. Miller.

Nov. 17, National Industrial Conference Board Inc.: General session for all associates, Penn-Sheraton Hotel, Pittsburgh. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Nov. 17-30, Air Conditioning & Refrigeration Institute: Annual meeting, Hollywood Beach Hotel, Hollywood Beach, Fla. Institute's address: 1346 Connecticut Ave. N.W., Washington, D. C. Managing director: George S. Jones Jr.

Nov. 27-Dec. 2, American Society of Mechanical Engineers: Annual meeting, Statler-Hilton Hotel, New York. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Nov. 28-Dec. 2, Exposition of Power & Mechanical Engineering: Coliseum, New York. Information: International Exposition Co., 480 Lexington Ave., New York 17, N. Y.

Nov. 29-Dec. 1, Electronic Industries Association: Winter meeting, Fairmont Hotel, San Francisco. Association's address: 1721 DeSales St. N.W., Washington 6, D. C. Secretary: James D. Secrest.

Nov. 30-Dec. 2, Metallurgical Society of AIME: Electric furnace conference, Morrison Hotel, Chicago. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: R. W. Shearman.

Dec. 3-6, American Institute of Chemical Engineers: Annual meeting, New Yorker Hotel, New York. Institute's address: 25 W. 45th St., New York 36, New York. Secretary: F. J. Van Antwerpen.

Dec. 6, Electric Overhead Crane Institute: Annual meeting, Carlton House, Pittsburgh. Institute's address: 1 Thomas Circle, Washington 5, D. C. Executive secretary: J. H. Peritz.

Dec. 7-9, National Association of Manufacturers: Annual meeting, Waldorf-Astoria Hotel, New York. Association's address: 2 E. 48th St., New York 17, N. Y. Executive vice president: Charles R. Sligh Jr.

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B-L-H develops combined extrusion-forging press

A LOEWY combination press of 1000-ton capacity for extruding and forging rare and high-temperature metals has been developed by Baldwin-Lima-Hamilton and installed at a research laboratory of a large Government facility.

The vertical frame machine is water-hydraulic accumulator driven and designed for the ultra-high speed performance and quick tonnage control required for work on critical material.

The effective pressing speed, infinitely variable up to about 1000 in. per minute, allows use of the machine for a maximum range of metallurgical research work. A 3-cylinder arrangement permits operation at ⅓, ⅔ and full tonnage of the press. Instantaneous changeover is effected from the operator's pulpit.

This versatile machine is designed for direct and indirect extrusion. And when used for free forging, it provides both deep penetration and fast planishing. In sum, it is one more striking example of B-L-H's ability to supply industry with the highly specialized equipment required of today's metallurgical laboratory research. Let us know your needs and be assured they will be given our best attention. Write Dept. B-11.

B-L-H's combined extrusion-forging press of 1000-ton capacity on the erection floor.

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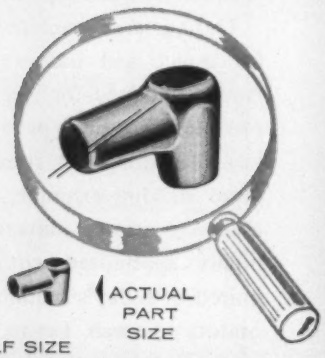
To obtain the desired physical and design requirements in a part at the lowest cost, there is usually one specific process by which that part can be most successfully and economically manufactured. Because the Mueller Brass Co. offers a variety of production methods, you get sound engineering, accurate production method analysis, our assurance of getting the best product at the lowest cost . . . regardless of metal specified or the size of your particular part.

BRASS, BRONZE, ALUMINUM FORGINGS

The two parts shown here dramatically illustrate the ability of the Mueller Brass Co. to produce precision forgings regardless of size or configuration. Both the tiny dental drill nozzle and the big heat exchanger shell hub, which is the largest of its kind ever produced, were forged to exacting specifications. The weight of the nozzle is only a few ounces while the shell hub weighs 40 lbs., and has a forged pocket 7 1⁵⁄₁₆″ in diameter and 4³⁄₁₆″ deep. By way of size comparison, the pocket is big enough to hold over 14,000 of these tiny drill nozzles. By forging the pocket, considerable machining time and money was saved. The sound, dense structure of the shell hub makes it ideal for the high pressure application for which it was designed. The forging not only does the job better, but was produced for 25% less than the casting it replaced. Experience makes it possible for the Mueller Brass Co. to produce high quality precision forgings regardless of specifications . . . why not put this experience to work for you?



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When you are designing, specifying or purchasing fabricated parts, call in the "Man From Mueller Brass Co." to help lower costs and improve your products. Sales and engineering service is available to you at Mueller Brass Co. offices throughout the United States. Make Mueller Brass Co. your one dependable source for all your part needs.

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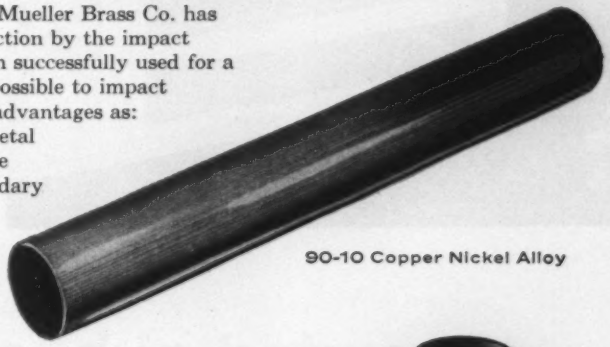
Today, because of vast experience in alloys, the Mueller Brass Co. has greatly expanded the possibilities of parts production by the impact extrusion method. Aluminum, of course, has been successfully used for a multitude of tubular shapes. But now it is also possible to impact parts of copper alloys incorporating such major advantages as: closer tolerances, better finish and appreciable metal savings. Because of dimensional accuracy possible with the impact extrusion, the necessity of secondary machining operations is often eliminated.

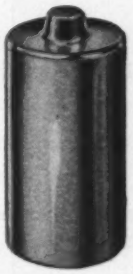
The parts shown here are representative of the group now being economically produced as impact extrusions by the Mueller Brass Co. who offer complete engineering and design service in the development of new parts from copper base alloys.



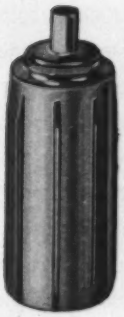
90-10 Copper Nickel Alloy

Aluminum Alloy 6061

Oxygen Free High Conductivity Copper



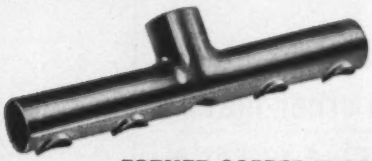
Special Alloy 902



Tellurium Copper Alloy

Low Phosphorus Copper Alloy

SOURCE FOR ALL THESE OTHER PRODUCTS



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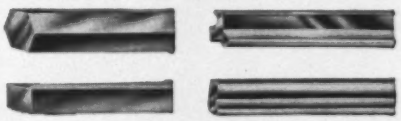

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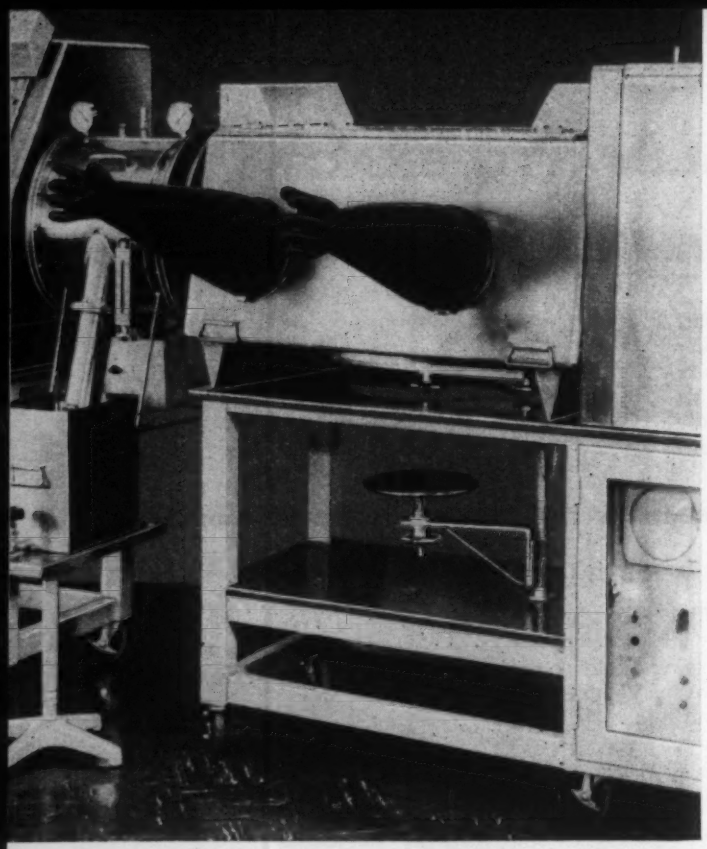

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When laboratory people talk of an "absolutely sterile environment" they mean just that. Only Stainless Steel can help make it that way. In this germ-free system, spot-welded Stainless Steel with molded silicone-rubber gaskets helps maintain a sterile environment for breeding germ-free animals. The apparatus is used to study infectious diseases, immunochemistry and cancer. Stainless Steel is easily cleaned because its smooth, pocket-free surface can't harbor contamination.

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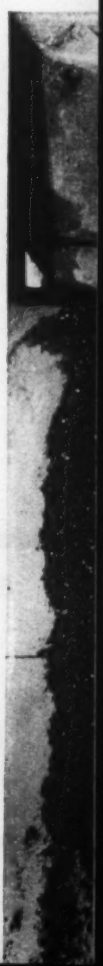
Few things are dirtier than wet coal fines. And corrosive. The combination of moisture and sulfur eats away most materials in nothing flat. Not Stainless Steel. Stainless has exceptional corrosion resistance to anything that can happen in coal or ore processing. Screens, chutes and other handling equipment are easily fabricated from Stainless Steel. Stainless even has what they call "slideability"; its smooth surface prevents build-up and clogging. And it lasts up to 10 times longer than other materials.



USS Stainless Steels... no other metal makes such a material difference in so many applications

This mark tells you a product is made of modern, dependable Steel.

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No material can match Stainless Steel's versatility. Stainless Steel offers designers and fabricators a unique combination of properties: superior strength, extraordinary corrosion resistance to an enormous variety of reagents, outstanding high temperature properties, and excellent appearance. It is easily fabricated and, because Stainless Steel lasts longer, actually costs less in the long run. If you have a selection or delivery problem, ask your USS representative or nearest steel service center.

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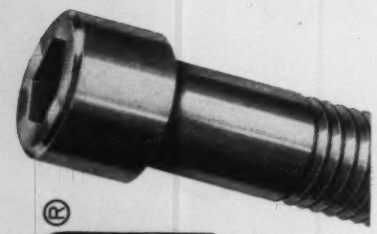

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ALCO HI-QUA-LED STEEL FORGINGS CUT MACHINING COSTS UP TO 50%

ALCO

how three leading companies save money with ALCO Hi-Qua-Led steel forgings

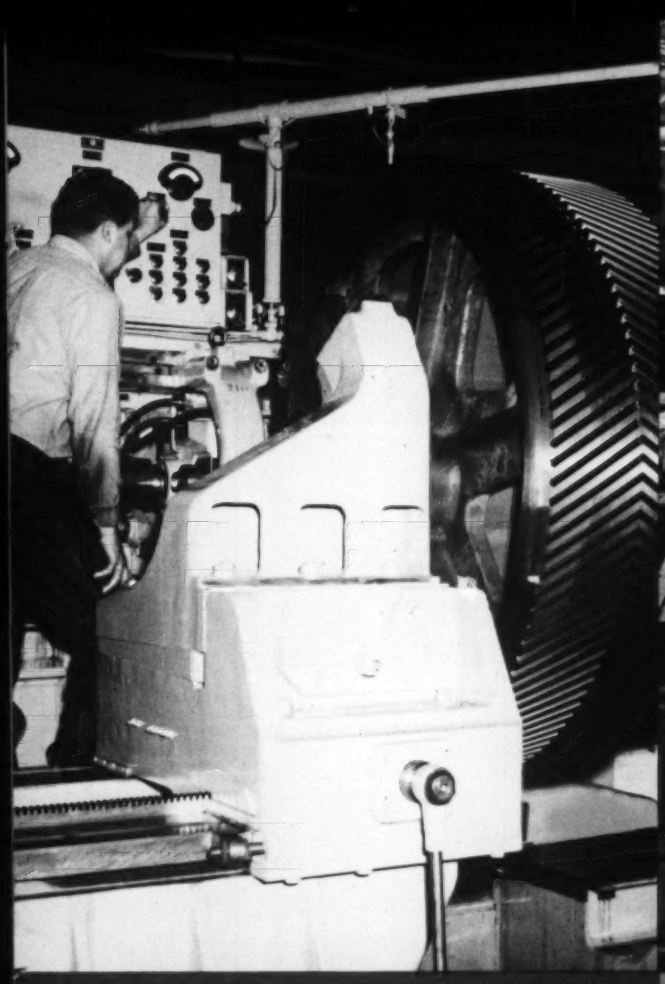
case report:

HI-QUA-LED FORGINGS CUT MACHINE TIME 45%

THE TOOL STEEL GEAR & PINION CO., Cincinnati, achieves large savings in gear-machining operations with ALCO's Hi-Qua-Led Steel forged and rolled rings. On one gear ring, for example, Tool Steel reduced turning time 22% before hardening, and 42% after hardening. Gear hobbing time was cut 43%, rebore 45% and key seating 50%. Average time reduction was 45%.

Hi-Qua-Led forgings machine this easily because of a lead additive which increases shear angle and reduces tool friction. Result: heavier cuts and higher cutting speeds. Expensive tooling lasts longer—five, 10, even 100 times longer.

These big savings are only part of the story. Because Hi-Qua-Led forgings have the same mechanical properties as regular forgings of the same grade, Tool Steel can stand squarely behind its unique guarantee: "Any deficiency made good by cash or new materials."



case report:

HIGHER QUALITY GEARS FOR THE SAME COST

LUFKIN FOUNDRY & MACHINE CO., Lufkin, Tex., uses Hi-Qua-Led forged and rolled rings for 60 in. diam. herringbone gears in its large oil-well pumping units. Previously, cast rings had been used.

Lufkin F&M finds that, although the Hi-Qua-Led rings' price is higher, their machinability cuts the cost of the finished fabricated gear to that of the cast gear. Lufkin is thus able to put a better, more uniform gear in its pumping units for the same cost and provide improved equipment and higher value to its customers.

The table below shows how Hi-Qua-Led rings reduced machining costs at Lufkin F&M.

HI-QUA-LED RING vs CAST RING			
OPERATION	CASTING	HI-QUA-LED	HI-QUA-LED SAVINGS
Turning	20 hours	8.1 hours	59.5%
Shape Teeth	80 hours	60 hours	25%
Tool Expense	$75.00	$25.00	67%

case report:

INCREASED CAPACITY WITH NO ADDITIONAL INVESTMENT

WARNER & SWASEY CO., Cleveland, uses Hi-Qua-Led open-die forged bars for the pentagon-shaped tool holders in their 2AC and 3AC automatic chucking machines. It adopted Hi-Qua-Led for this job three years ago, because it found that machining speeds on every operation—turning, milling, sawing, trepanning, grinding and drilling—could be increased by at least 50%.

The decrease in machining *time* Warner & Swasey gets is about 3 hours per forging. This compensates for the extra cost of Hi-Qua-Led. But Warner & Swasey reasons that Hi-Qua-Led actually expands its production capacity, without any added investment in factory or tools. This is worth about $60 per forging, according to Warner & Swasey figures.

ALCO

ALCO HI-QUA-LED STEEL FORGINGS RAISE PROFIT WITHOUT LOWERING QUALITY

While lowering machining costs, ALCO Hi-Qua-Led forgings have the same mechanical properties as regular forgings of the same grade. "In use" tests show that tensile strength, impact, fatigue and other properties are unchanged. Further, ALCO's exclusive patented lead-addition process guards against lead inclusions or segregates. You get the high quality you expect in custom-forged material.

Hi-Qua-Led Steel rings and forgings are furnished in any steel analysis. If you wish, ALCO will make up your order of regular forgings and include in it a Hi-Qua-Led forging, at no extra cost, for ALCO-supervised tests in your own plant. ALCO Products, Inc., Dept. 1501, Schenectady 5, N. Y.

SIZES AVAILABLE

OPEN DIE FORGINGS — RECTANGULAR
Maximum width — 32 in.
Maximum height — 32 in.
Maximum length — 40 ft
Maximum weight — 36,000 lb
Minimum weight — 1,000 lb

MANDRELLED RING FORGINGS
Maximum OD — 82 in.
Minimum OD — 24 in.
Maximum width — 60 in.

OPEN-DIE FORGINGS — ROUNDS
Maximum OD — 36 in.
Maximum length — 40 ft
Maximum weight — 36,000 lb
Minimum weight — 1,000 lb

ROLLED RING FORGINGS
Maximum OD — 160 in.
Minimum OD — 18 in.
Maximum width — 24 in.

ALCO FORGINGS

ALCO PRODUCTS, INC.

How Gisholt Fastermatics turn 90% of setup time into profitable production

Saves nearly four hours in just one setup — that's how the new 1960 Gisholt Fastermatic® Automatic Chucking Turret Lathe with FeeDial compares with the models produced only ten years ago.

Here's the record for the three models produced since 1950:			
	1950 Model	1955 Model	1960 Model
Time for spindle speeds, 6 stations	10 Min.	1 Min.	1 Min.
Time for feed rates, 6 stations	36 Min.	30 Min.	5 Min.
Time for setting traverse trips	54 Min.	18 Min.	9 Min.
Time for turret positioning	150 Min.	45 Min.	15 Min.
Total time	250 Min.	94 Min.	30 Min.

Multiply the savings shown above by the number of setups you do in your shop in one week, in four weeks . . . in one year. You'll quickly see extra profits you may now be losing with an outmoded lathe, regardless of make. That is the price of obsolescence!

Your local Gisholt Representative will be happy to give you the facts and figures on the Fastermatics with FeeDial — how *they may* be applied to your work for extra profits. Contact him, or write us.

FeeDial® and selector switches slash setup time for Automatic Chucking Turret Lathe

—lets you set individual feed rates for all six turret stations in just five minutes or less. You simply turn the dials, and that's it. And by flicking switches you can set spindle speeds and functions in only five minutes more. With such new setup speed, the new Fastermatic brings cost-cutting automatic production to a greater range of small-lot jobs than ever before.

Turret Lathes • Automatic Lathes
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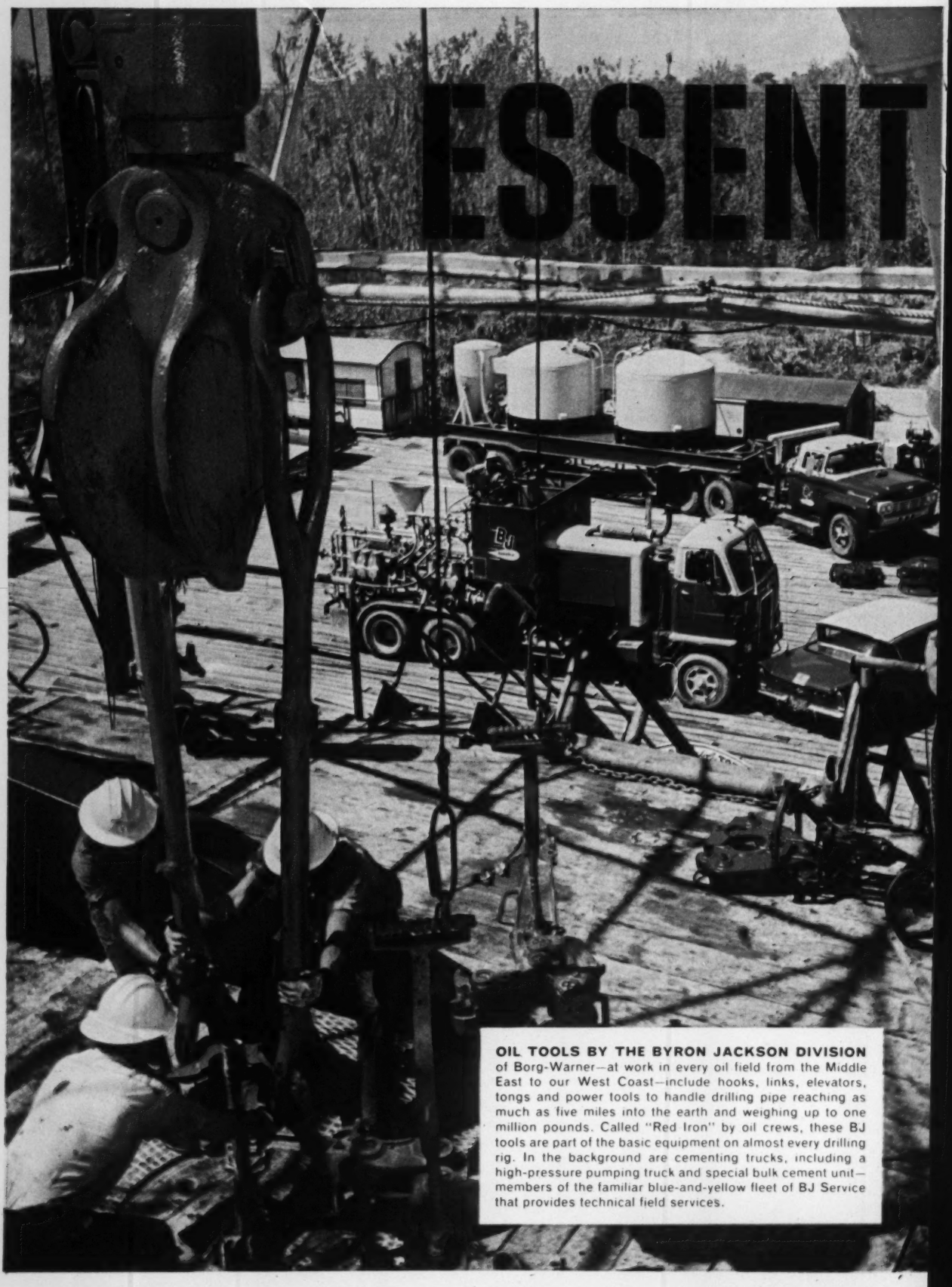


OIL TOOLS BY THE BYRON JACKSON DIVISION of Borg-Warner—at work in every oil field from the Middle East to our West Coast—include hooks, links, elevators, tongs and power tools to handle drilling pipe reaching as much as five miles into the earth and weighing up to one million pounds. Called "Red Iron" by oil crews, these BJ tools are part of the basic equipment on almost every drilling rig. In the background are cementing trucks, including a high-pressure pumping truck and special bulk cement unit—members of the familiar blue-and-yellow fleet of BJ Service that provides technical field services.

IALS

BY BORG-WARNER

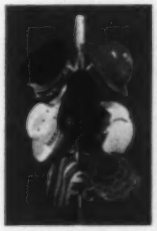
Among the 7 Hats of Borg-Warner —a helmet to symbolize our contributions to the oil, steel and chemical industries

Without the tools and techniques of man, our country's huge reservoir of oil would remain untapped today. How valuable would a deposit of iron ore be without men and machines to make steel? Not even Nature herself can equal the qualities of such modern synthetic materials as plastics.

Partner to the growth and progress in oil, steel and chemicals are many of the divisions and subsidiary companies of Borg-Warner Corporation. B-W's Byron Jackson Division, for example, has long been the pacemaker in special tools required to drill oil wells which must probe miles below the earth's surface. BJ Service crews and equipment provide the cementing and treating techniques which keep these wells healthfully productive . . . and BJ centrifugal pumps supply the pulsing power for pipelines, refinery, chemical and metal-making processes.

Three B-W divisions—Ingersoll Steel, Calumet Steel and Franklin Steel—produce such quality specialty steels as stainless, alloy, tool and saw steels and bar mill products. Marbon Chemical Division is responsible for the creation of Cycolac®, the Borg-Warner plastic whose balance of properties make it truly unique, along with reinforcing resins and rubber-to-metal adhesives for the rubber industry and synthetic resins for the paint industry.

The years ahead promise a growing need for oil, steel and chemicals—and promise, too, even greater service to these industries by Borg-Warner.



B-W

The 7 Hats of Borg-Warner . . . (top) national defense; oil, steel and chemicals; (middle row) agriculture; industrial machinery; aviation; (bottom) the automotive industry; home equipment.

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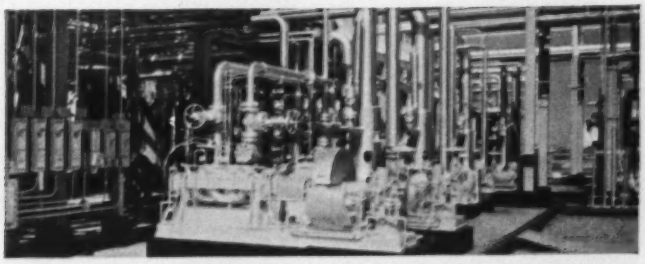
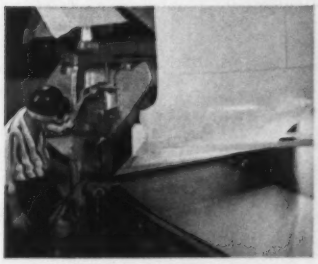
BETTER PRODUCTS THROUGH CREATIVE RESEARCH AND ENGINEERING

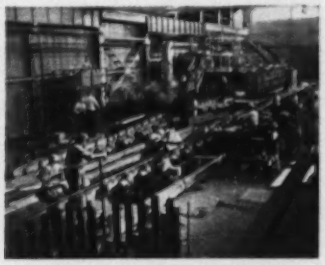
Borg-Warner Corporation • 200 South Michigan Avenue • Chicago 4, Illinois



PUMPS BUILT BY BYRON JACKSON are equally at home handling hot oil at 800° refinery temperatures (as shown above) or in feeding low-temperature liquid oxygen (—320° F.) to a modern steel furnace. Serving almost every phase of the oil, steel and chemical industries, BJ pumps transport essential fluids . . . provide water under pressure for cleaning, cooling and secondary oil recovery . . . push petroleum products through thousands of miles of pipeline "arteries."



STAINLESS STEEL, solid and clad—processed for exceptional forming abilities—is just one of the steels made by Ingersoll Steel. A modern specialty mill, Ingersoll is geared to meet customers' analysis, size, gauge, finish "specs"—exactly, economically.



STEEL BARS AND SHAPES rolled by Calumet and Franklin Steel Divisions meet exacting specifications of the construction, farm equipment, material handling and automotive industries. Other steel products: fence posts, tubing, special-use sections.

"BETTER IN MORE WAYS THAN ANY OTHER PLASTIC" sums up why hundreds of consumer and industrial products use Cycolac—the tough, hard, rigid ABS plastic developed and produced by B-W's Marbon Chemical Division. Familiar products easily and economically molded from colorful Cycolac pellets include (left to right) portable cooler, safety helmet, transistor radio case, portable mixer housing, telephone, typewriter housing, luggage.

WHAT BORG-WARNER MEANS TO YOU!

By making parts and materials that go into a great number and variety of finished products, Borg-Warner influences the activities of the American family. On a fall afternoon, helmets that protect football players might well be molded of Cycolac. Auto fuel that transports spectators to the site of the game is very likely refined with the help of Byron Jackson pumps. And, without a doubt, the car itself contains parts made by any one of many B-W divisions. Wherever you live, work, play or travel, Borg-Warner touches your life importantly every day.

Your employees' retirement dollars may be your most productive dollars

The dollars you put into a pension or profit sharing plan for your employees are dollars at work for you. Satisfied employees, assured of a secure future, are an asset to any business.

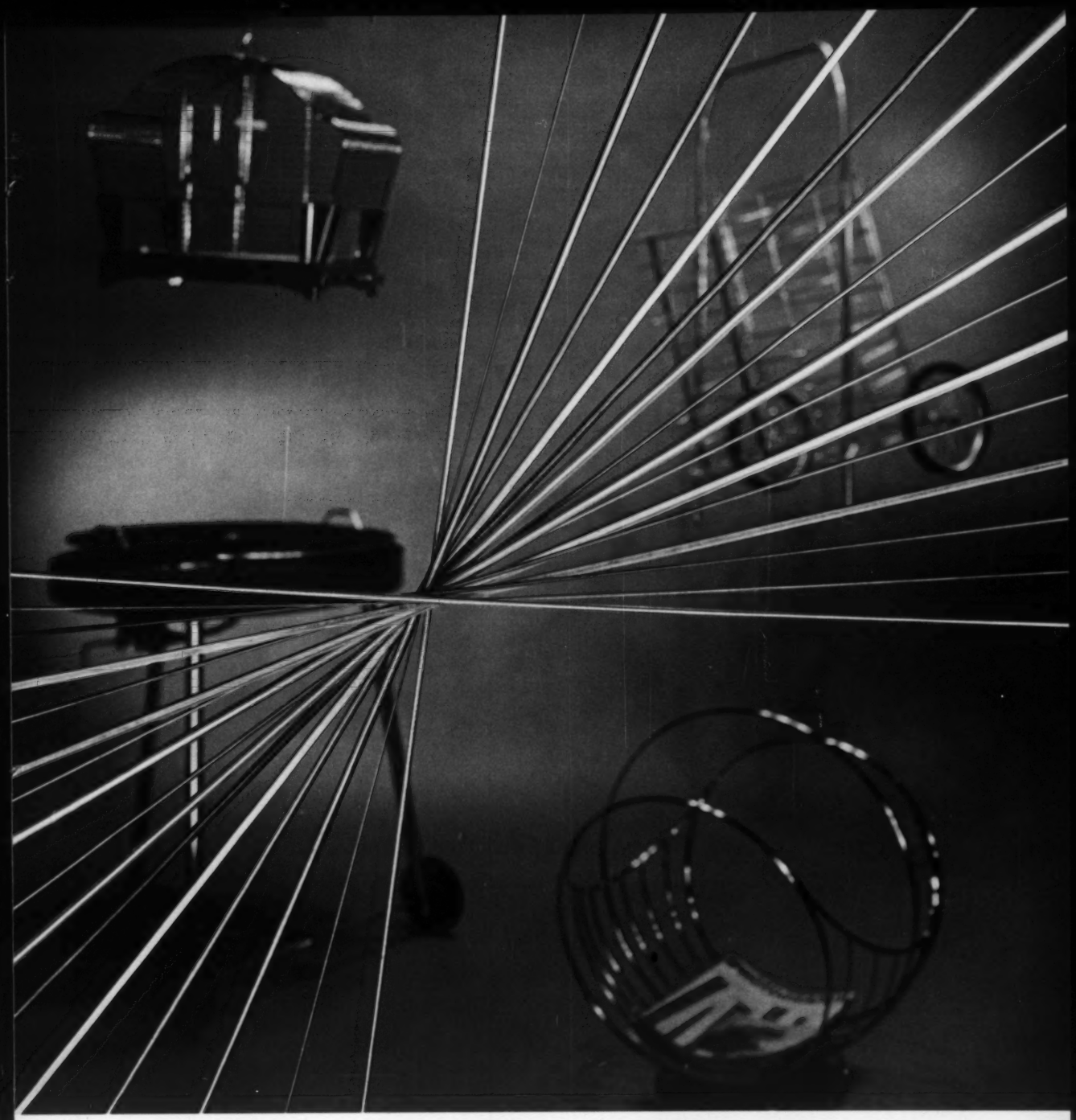
Morale is improved; older employees can be retired; younger employees promoted; good workers attracted; turnover reduced. But, in addition to providing definite retirement benefits for employees, an Ætna Life Pension or Profit Sharing Trust benefits management — and tax advantages are realized by both employer and employee.

As a leader in the field, Ætna Life will tailor-make a retirement plan to fit your company's individual requirements. Advice of our experienced experts is available without charge or obligation through your Ætna Life office.

Ætna Life Pension and Profit Sharing Plans work for you!

- Improve morale
- Provide for orderly retirement
- Give basis for promotions
- Reduce turnover
- Strengthen public relations
- Offer tax advantages

ÆTNA LIFE
INSURANCE COMPANY
Hartford 15, Connecticut
Affiliates: Ætna Casualty and Surety Company
Standard Fire Insurance Company



Need steel wire?

Bethlehem makes nearly all kinds

Analyses: Low-, medium-, and high-carbon; many alloy grades. *Finishes:* bright, galvanized, bethanized (electrolytically zinc-coated), aluminum-coated, limed, and many special finishes. *Treatments:* annealed, lead-annealed, patented, and various special treatments to meet specific requirements. *Qualities:* industrial, cold-heading and cold-rolling, chain, stapling, ball, "scrapless" nut, upholstery spring, welding, and many others.

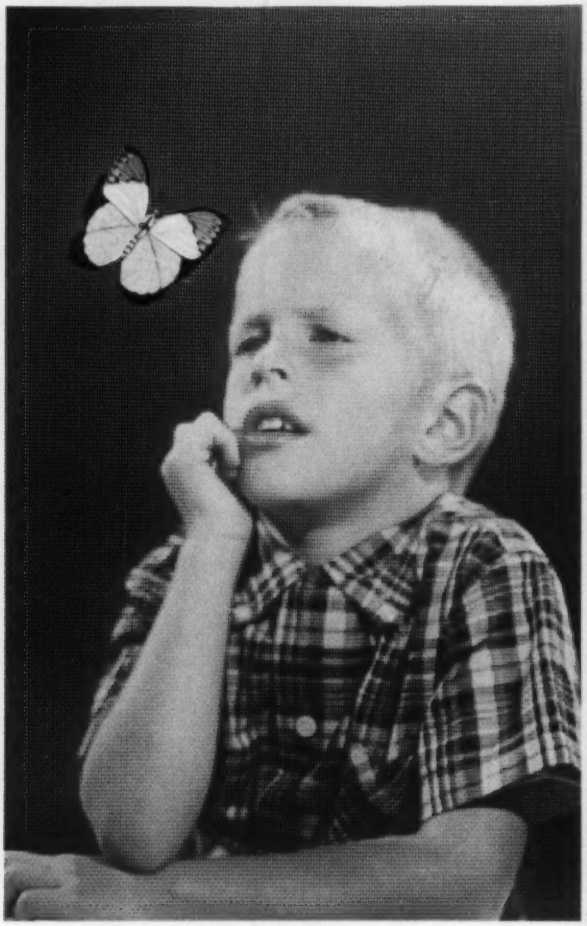
Steel

for Strength
. . . Economy
. . . Versatility

BETHLEHEM STEEL

BETHLEHEM STEEL

Weld it... weave it...



We furnished this manufacturer just what he wanted for the special wrench being welded here—wire that is strong, easy to shape, and has a clean finish that produces a sound weld . . . *the first time.*

Using the steel grade recommended by our metallurgical engineers, this customer has been turning out top-quality wire screening for many years. The efficient operation of the wire in swift-working, automatic looms is a result of the freedom from defects which is "built into" the steel.

Whatever you do with steel wire

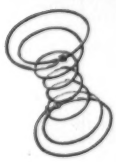
Bethlehem supplies steel wire for all of the various manufacturing processes from cold-heading to coiling. Our metallurgists are always available to help select the correct type of wire for your job. And they can often give you practical advice that helps to trim your production and handling costs.

Steel

for Strength
. . . Economy
. . . Versatility

form it... coil it... twist it!

Laundry and shopping carts must take rough handling, as well as resist corrosion. This wire former has found that the wire we recommended forms easily, and helps them turn out a laundry cart that is light, easy to handle, and durable.



Bethlehem designs an upholstery spring wire specifically for coil springs that hold through years of active family use. For years we have supplied leading spring-makers. These innersprings are coiled from Bethlehem Silver Star Spring Wire for a quality line of mattresses and upholstered products.

In the handy household brush Bethlehem wire is brought to the housewife's doorstep. We supply this brush-maker with an electrolytically zinc-coated steel wire which is twisted into brush handles. Bethlehem's easy-forming, bethanized wire takes this severe twisting, holds the bristles, and gives long service.

...Bethlehem can supply it

BETHLEHEM STEEL

BETHLEHEM STEEL

cold-head it...

When you're going to cold-head a product, the wire has to be just the right grade. A special type of Bethlehem cold-heading wire was developed by Bethlehem's metallurgists for this component of an automotive steering-rod relay system. The two-piece part, comprising a stud and a seat, has been replaced by a single part which is now cold-headed at a considerable savings.

ORIGINAL PART
MADE IN TWO PIECES

NOW COLD-HEADED
IN ONE PIECE

Bethlehem supplies steel for virtually every use

Here's a partial list of steels and specialty products in the Bethlehem line:

BARS AND BILLETS:
Carbon and alloy AISI grades
Concrete reinforcing bars
Leaded steels
Special rolled sections

TOOL STEELS:
Water, oil, and air-hardening grades

FORGINGS:
Drop, press, hammer, and upsetter
Rolled-and-forged sections

ROD AND WIRE:
Hot-rolled rods, wire, and wire products

SHEETS:
Hot- and cold-rolled
Continuously galvanized
Enameling sheets

TIN MILL PRODUCTS:
Electrolytic and hot-dip tinplate; blackplate

PLATES:
Universal and sheared
Flanged and dished heads

WIRE ROPE AND SLINGS

FASTENERS:
Bolts, cap screws, rivets
Special fasteners

STEEL PIPE:
Continuous butt-weld
Electric resistance-weld

STRUCTURAL SHAPES

COLD-FORMED SHAPES

PALLET RACKS

WELDMENTS:
Frames, tanks, housings, vessels

FREIGHT CARS, PARTS, WHEELS, AXLES

RAILS:
Tee, crane, girder

CASTINGS:
Carbon, alloy, stainless steel
Iron, brass, bronze

Publications Dept.,
BETHLEHEM STEEL COMPANY
Bethlehem, Pa.

Please send me information on steel wire for use in .....

Also send me information on.....

.....

Name.....

Company.....

Address.....

City..... *Zone*..... *State*.....

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.
Export Sales: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

"All Washington's just across the river from our new lab!"

Locating your laboratory or light, technical industry in Northern Virginia pays double dividends. For it puts you close to both the matchless research facilities and the rich cultural life of the Nation's Capital, with its colleges, universities, technical schools, museums, concert auditoriums and theaters. ■ Next door, too, are the great Potomac rail yards, the Alexandria deep-water steamship channel, and the new Dulles International Airport that will soon give you the key to the jet age. Without cost or obligation, let VEPCO do a bit of confidential plant site scouting for you in or near some of Northern Virginia's many pleasant communities. Write, wire or phone VEPCO today.

VEPCO **VIRGINIA ELECTRIC and POWER COMPANY**

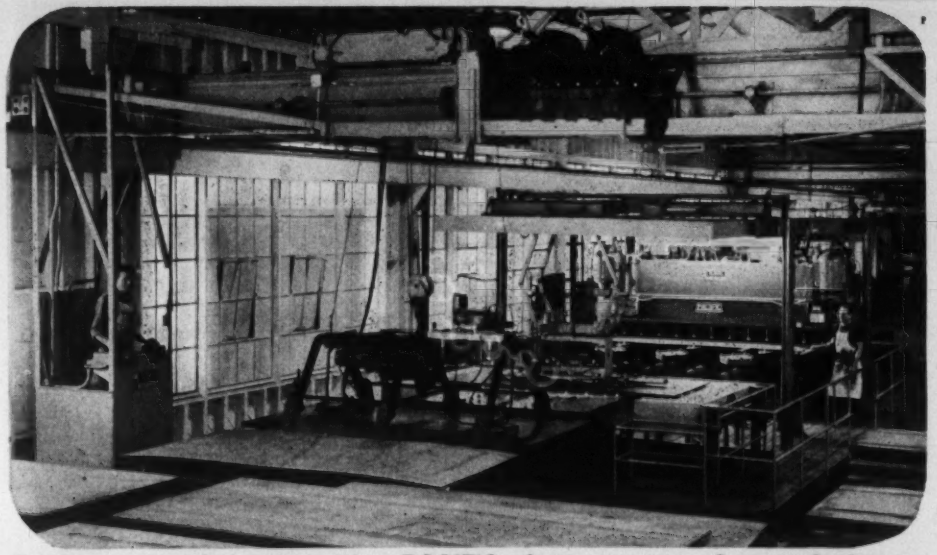
Clark P. Spellman, Manager—Area Development, Electric Building, Richmond 9, Virginia • MIlton 9-1411

SERVING THE TOP-OF-THE-SOUTH WITH 1,990,000 KILOWATTS — DUE TO REACH 2,580,000 KILOWATTS BY 1962

CUT CONTROL ENABLES PACIFIC HYDRAULIC SHEAR TO DO JOBS IMPOSSIBLE ON ANY OTHER SHEAR!

PACIFIC *Cut Control* is a group of adjustments permitting all controls to be set at the optimum value for perfect shearing of each different job: light gauge, heavy plate, polished stainless, soft aluminum, brittle alloys, long narrow strips, high speed cycling for high production, extreme accuracy for precision work. Unlike conventional shears limited in shearing ability by permanent settings without possible adjustment, PACIFIC can be controlled to fit the job exactly. No longer is it necessary to compromise with quality because the shear cannot be adjusted.

- **Adjustable holddowns** eliminate marking of soft polished sheets.
- **Holddowns move down independently of knife** to insure exact alignment of plate before cutting.
- **Adjustable knife clearance** for light gauge shearing with heavy plate shear. Eliminates rough secondary shear fracture in heavy shearing.
- **Rake angle adjustment** for minimum twist or bow in cutting narrow strips.
- **Cushioned shearing** plus rake angle adjustment enable brittle alloys to be cut.
- **Depth of stroke** readily adjustable for slitting.
- **Adjustable cycling speed** so machine speed can be set to match operator's ability to feed plate.
- **Non-wedging back gauge lift** to prevent wedging of narrow strips being cut.
- **Rapid, precision powered back gauges.**



Triples output by automating PACIFIC shear... saves 3 men, 2 shears!

Food Machinery & Chemical Corp., Riverside, Calif., reduces a 3 shear, 5 man operation to a 1 shear, 2 man operation by developing an automated sheet and plate handling system to match the high cycling speed of the PACIFIC hydraulic shear. System consists of vacuum handlers on overhead cranes, accumulator conveyor, hinged ball transfers, powered scrap chute behind shear, return conveyor under shear, table to elevate and rotate pieces for additional cutting. Shockless hydraulic cutting permits mounting shear on I beams above return conveyor for simplified materials handling.

Heavy duty shear for continuous mill type service

Safe—the only shear that can be stopped instantly in emergency and is protected against overload

3 to 8 times longer knife life than mechanical shears

Noiseless operation—quieter than a sewing machine

Insignificant maintenance—all moving parts run in filtered oil and are protected against overload

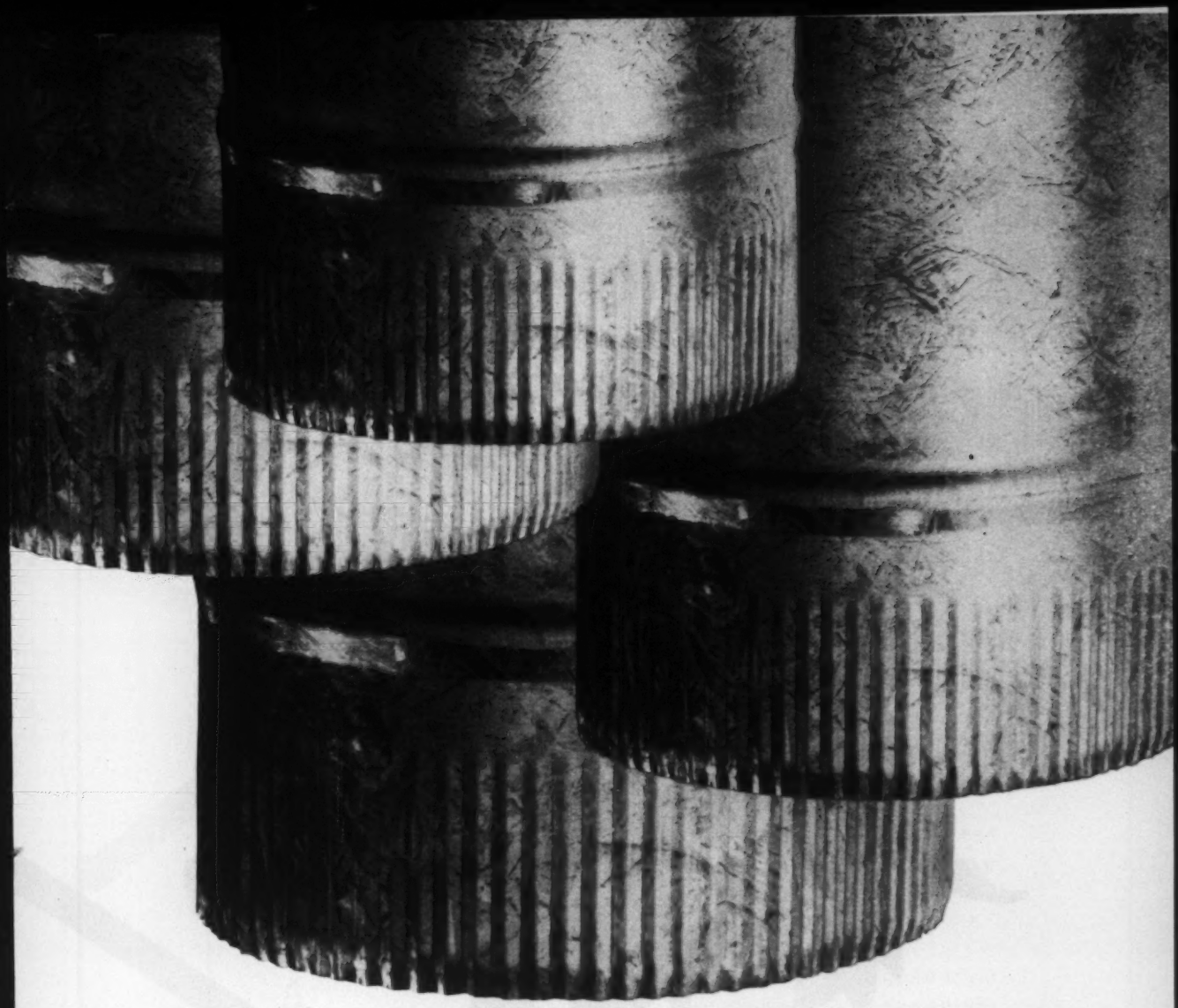
Hundreds of dollars saved in foundation cost

Proven design—over 100 PACIFIC Shears in operation up to 5 years.

PACIFIC PRESSES AND SHEARS

PACIFIC INDUSTRIAL MFG. CO., OAKLAND, CALIF. • PACIFIC PRESS AND SHEAR CORP., MT. CARMEL, ILL.

DISTRIBUTORS: ALBUQUERQUE, N. M.; DENVER, COLO.—R. E. Dubac Associates • ARIZONA; LOS ANGELES AND BURLINGAME, CALIF.; NEVADA—Ternquist Machinery Company • ATLANTA GA.; ORLANDO, FLA.—J. R. Carlson Machinery Company • CHICAGO (North), Ill.—L. C. Evans & Company • CHICAGO (South), Ill.—B F M Machinery Co. • CLEVELAND, OHIO—Jackson Machinery DAVENPORT and DES MOINES, IOWA; KANSAS CITY and ST. LOUIS, MO.; OKLAHOMA—Moehlenpah Engr. Inc. • DETROIT, MICH.—Taylor Thompson Machinery Company • DALLAS, TEXAS—Machine Tool Associates • HAMILTON, OHIO—Anscheutz Machinery • HOUSTON, TEXAS—Butcher-Carter-Preston • INDIANAPOLIS, IND.; LOUISVILLE, KY.—H. B. Green Mch. Co. • NEW YORK CITY—Van Dyke-Churchill Co. • MILWAUKEE, WIS.; MINNEAPOLIS, MINN.—Gute Company • NORFOLK, VA.; KNOXSVILLE, TENN.—Tidewater Supply Co. • NEW ORLEANS, LA.—Dixie Mill Supply Co. PITTSBURGH, PA.—Howard Canning • PORTLAND, ORE.—Portland Machinery Company • ROCHESTER, N. Y.—Ogden R. Adams Co., Inc. • SALT LAKE CITY, UTAH—Todd Machinery Company • SEATTLE, WASH.—Portland Machinery Co. • EASTERN PENNSYLVANIA; WASHINGTON, D.C.; MARYLAND; DELAWARE; SOUTHERN NEW JERSEY—Edward A. Lynch Machinery Co. • WETHERSFIELD, CONN.—Beisel Machinery Company • TORONTO, ONT., CANADA—Hercules Presses Ltd. • WINNIPEG, MAN., CANADA—Taylor Machinery Company • HALIFAX, N. S.—Foullis Eng • Mexico City—Electronics S. A.



The more crimping you have to do, the more satisfied you will be with Weirkote Zinc-Coated Steel. There's no peeling, no chipping, no flaking. Work it to the limits of the steel base itself and the zinc coating remains intact assuring you of the complete corrosion protection that only zinc can give. Weirkote is made that way—to retain its protective zinc coating no matter how tough the forming and bending operations. A Weirton representative will gladly supply full information on Weirkote—another fine product of the Weirton Steel Company, Weirton, West Virginia.

Look for the STEELMARK on the products you buy; place it on the products you sell.

WEIRTON STEEL
Weirton, West Virginia

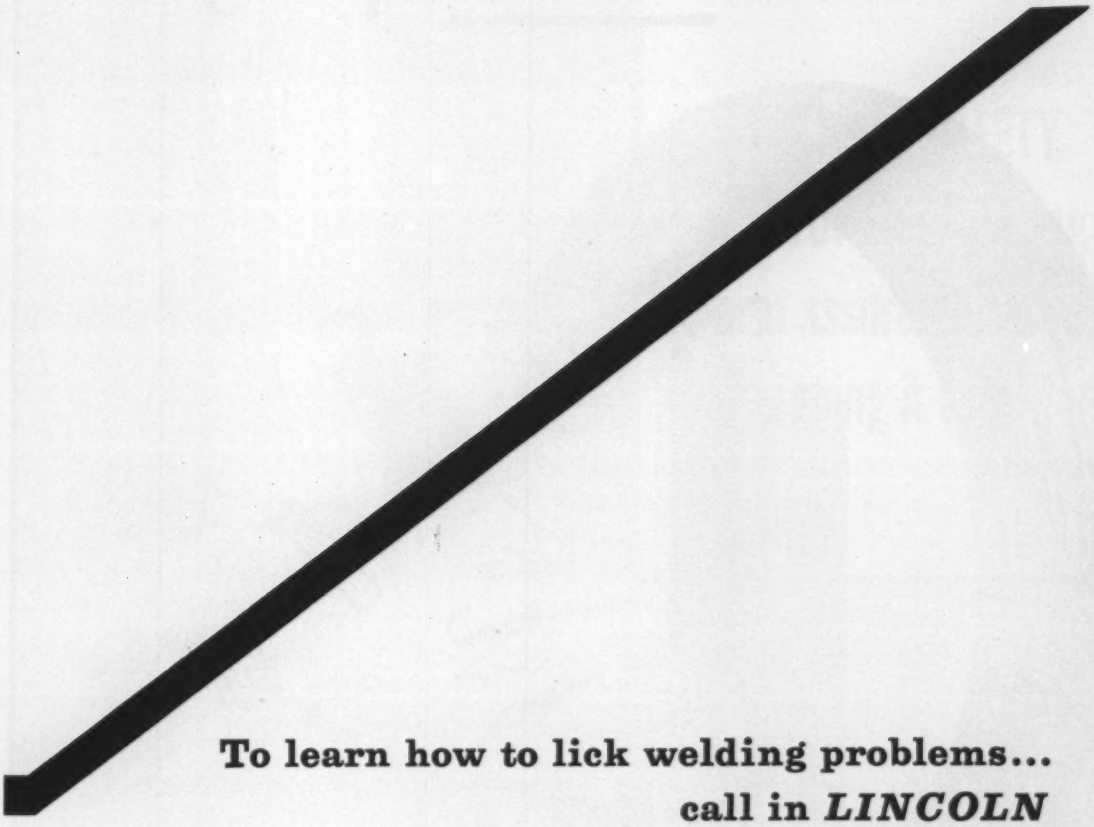
Weirton Steel is a division of **NATIONAL STEEL CORPORATION**

Weirkote will also be available in 1961 from National's Midwest Steel Division, Portage, Indiana.

To learn how an Aardvark licks termites... call in a *ZOOLOGIST*

(specialist on animals)

A native of Africa, the AARDVARK is a large, nocturnal, burrowing mammal subsisting largely on termites and has a long extensile tongue for gathering them. He has heavy claws for ripping open rotten logs to find more termites.



To learn how to lick welding problems... call in *LINCOLN*

(specialists in arc welding)

A VIRGINIA manufacturer of underground gasoline storage tanks needed to cut his welding costs . . . his highly competitive industry being plagued with low profits.

Although they were already using the LINCOLN automatic submerged arc process, the LINCOLN Field Engineer was able to show this company how to eliminate 25% of their welding labor. He switched them to the new LINCOLN vapor shielded INNERSHIELD process.

Now the 4000-gallon tanks, fabricated from 3/16" steel, are welded at 90 inches per minute . . . with three men doing the job formerly done by four. Thus, reduced labor costs have substantially increased the profit margin.

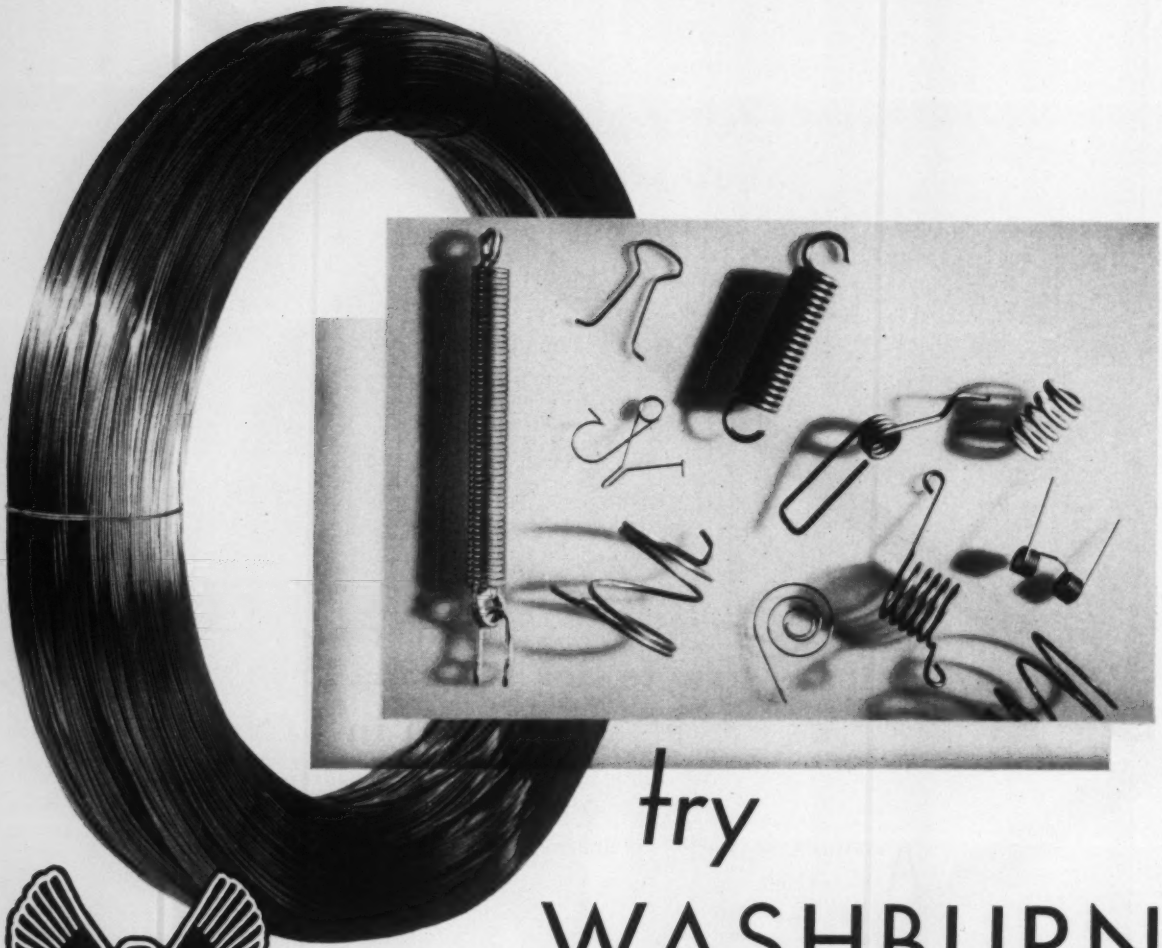
In addition, when this manufacturer licks a rolling and fit-up bottleneck, the three weldors will be able to almost double their present output with no additional help.

That's why we say it's a good idea to do business with LINCOLN where arc welding is a specialty and cost reduction comes to you as a "plus" at no charge.

THE LINCOLN ELECTRIC COMPANY
Dept. 2950 • Cleveland 17, Ohio

LINCOLN WELDERS

Have YOU a difficult Spring Job?



try

WASHBURN

PHOSPHATE COATED

MUSIC WIRE

114

WASHBURN

WASHBURN WIRE COMPANY, NEW YORK CITY

CLEAN, UNIFORM BILLETS–STRIP–RECTANGULAR, ROUND, FLAT RODS

TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

REQUIRED SAFETY FACTORS in steering arm assured by designing it to be forged

Typical steam forging hammer

By designing with forgings, a truck manufacturer can count on the required safety factors, with minimum "beefing-up" of parts to offset unknown internal structures or non-homogenious materials.

You, too, can achieve results like these by designing *with forgings* either at the start or on re-design. The benefits of forgings are equally impressive, whether you make home-workshop equipment or diesel engines.

Forgings start as *better* metal . . . are further *improved* by the hammer-blows or high pressure of the forging process.

Write for literature on the design, specification, and procurement of forgings.

When it's a vital part, design it to be FORGED

Drop Forging Association • Cleveland 13, Ohio

Names of sponsoring companies on request to this magazine

The lady is a killer

Tough, fast and maneuverable, this is 60,000 tons of fighting ship. She's the Navy's newest and biggest jet-age aircraft carrier—the USS Independence.

This mark tells you a product is made of modern, dependable Steel.

Stowed inside her gargantuan hull are approximately 100 deadly jet fighters. Her armor-plated flight deck stretches 1,000 feet and laps an area of 4 acres. And, she's equipped with four catapults that can snap four jets howling into the air in thirty-eight seconds.

She's fast. The lady easily batters through foam-tipped waves at better than 30 knots. She's maneuverable. The Independence can follow a difficult zig-zag pattern and still cruise a distance of 600 miles in a twenty-four hour period.

To help transmit her great power from eight massive boilers, National Tube supplied over 16,000 feet of USS

National Seamless Pressure Tubes in both carbon and alloy steels for use in steam lines, as well as over 4,000 feet of Standard Pipe. In addition, National Tube also furnished a number of Seamless Steel Cylinders for air actuating systems and recharging breathing units.

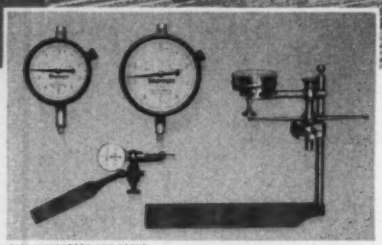
For the past 80 years, National Tube has handled tough tubular installations in the fields of line pipe, pressure tubing, mechanical tubing and oil country tubular products. For assistance, write to National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS and National are registered trademarks

National Tube Division of United States Steel

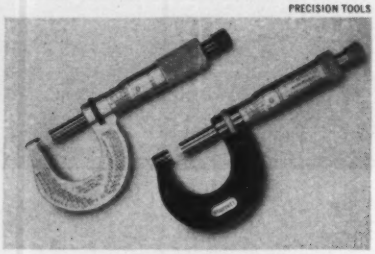
Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
United States Steel Export Company, New York

HACKSAWS, HOLE SAWS, BAND SAWS, BAND KNIVES — Starrett ALLOY BAND Double Carbide and SAFE-FLEX® High Speed Steel Band Saw Blades, REDSTRIPE® S-M High Speed Steel Hacksaw and SAFE-FLEX® High Speed Welded Edge Hole Saw.

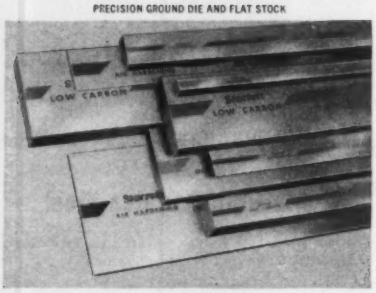


DIAL INDICATORS AND GAGES

PRECISION TOOLS



PRECISION GROUND DIE AND FLAT STOCK



Starrett®

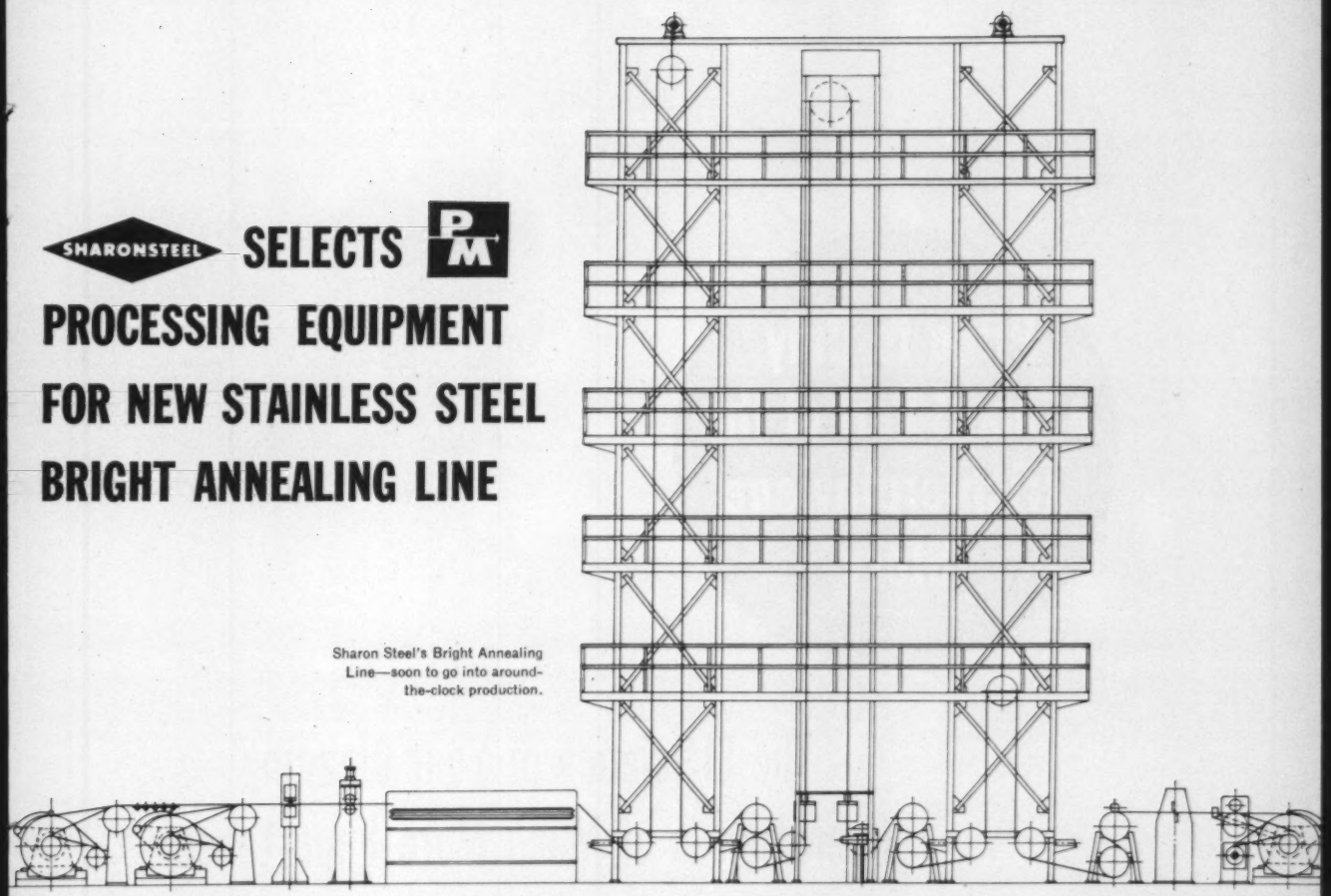
toolmaking craftsmanship gives you better bands and blades

From the modern, streamlined Starrett hacksaw and band saw plant comes a full line of precision-made band saws, band knives, hacksaws and hole saws. You can buy them with complete confidence through the same nearby Industrial Supply Distributor who sells you the many other fine products that carry the Starrett name. Write for complete Catalog No. 27. Address Dept. BG, The L. S. Starrett Company, Athol, Mass., U. S. A.

World's Greatest Toolmakers

SHARONSTEEL SELECTS P/M

PROCESSING EQUIPMENT FOR NEW STAINLESS STEEL BRIGHT ANNEALING LINE



Sharon Steel's Bright Annealing Line—soon to go into around-the-clock production.

Today's most interesting development in the automotive trim market is the volume production of bright annealed stainless strip. Sharon's decision to adopt this process backs up their aim of providing a bright decorative strip that meets the most severe corrosion tests.

When Sharon Steel Corporation—one of the pioneers in stainless steel production—engineered their new, modern bright annealing line, they specified equipment designed and built by Production Machinery Corporation that will enable the line to give:

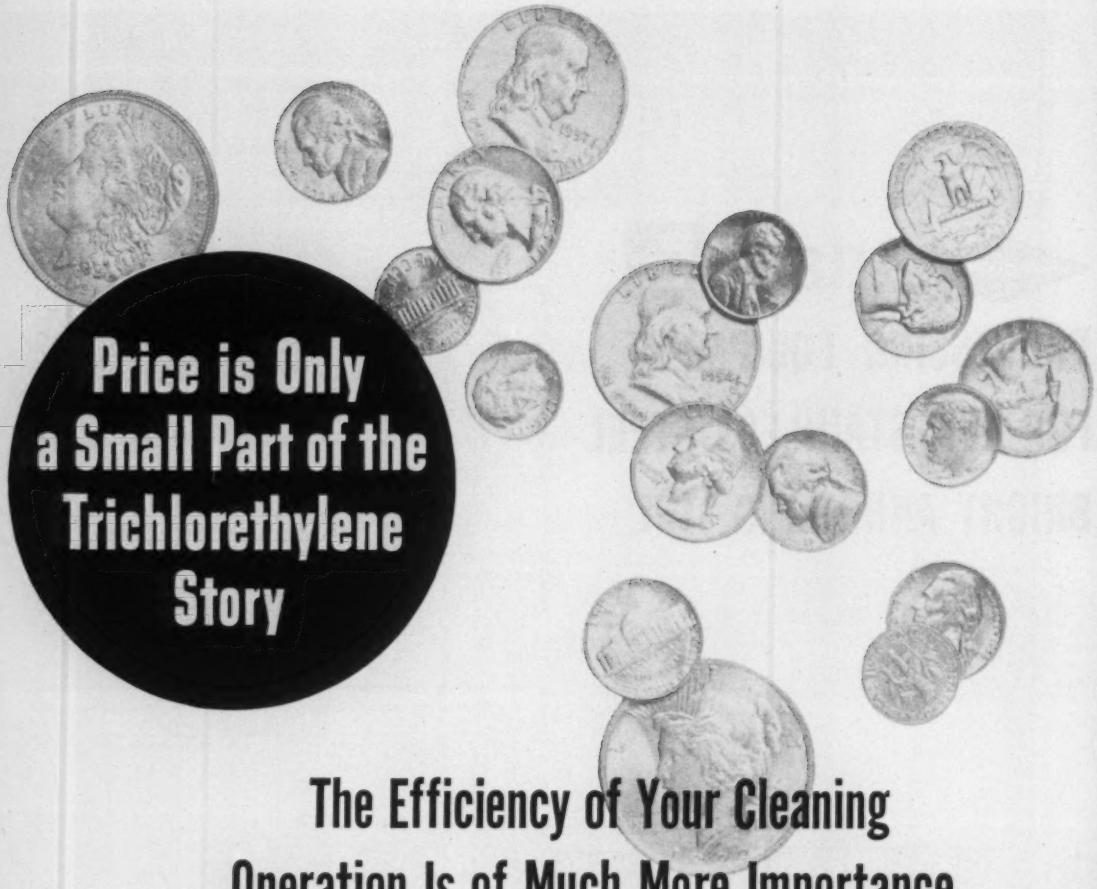
- stainless strip with a quality surface finish—protected by non-marking rolls
- continuous operation with minimum maintenance
- positive, sure strip tracking provided by 7 edge control points
- fastest coil handling and joining because of efficient, engineered equipment arrangement

Remember, P/M will design and produce what you require—the way you want it—when you need it. Let our engineers show you what "productioneered" processing lines and equipment can do to cut operating costs in your plant—build increased profits.

Production Machinery Corporation
Mentor, Ohio

Designers and Builders of Metal Processing Lines and Equipment including: lines for pickling, annealing, slitting, shearing, and cutting-to-length, grinding, scouring, coil build-up, inspection, and other sheet and strip processing lines and machinery.

P/M



Price is Only a Small Part of the Trichlorethylene Story

The Efficiency of Your Cleaning Operation Is of Much More Importance

Detrex Perm-a-clor is universally recognized as a premium grade solvent, selling at regular price. *There is none better.*

Buying from questionable sources or the use of unproved solvent can result in an inferior finishing operation which actually costs money instead of saving it.

One sure way to save *real* money on trichlorethylene is through an expert engineering analysis of the overall degreasing operation—your equipment, your methods, the proper instruction of your people.

Detrex engineers have been making such operational studies for more than 30 years. In many, many instances they have set up a program that has reduced solvent consumption by 15% to 25%. They would like to help you.

Depend on DETREX for Every Metal Cleaning and Processing Need

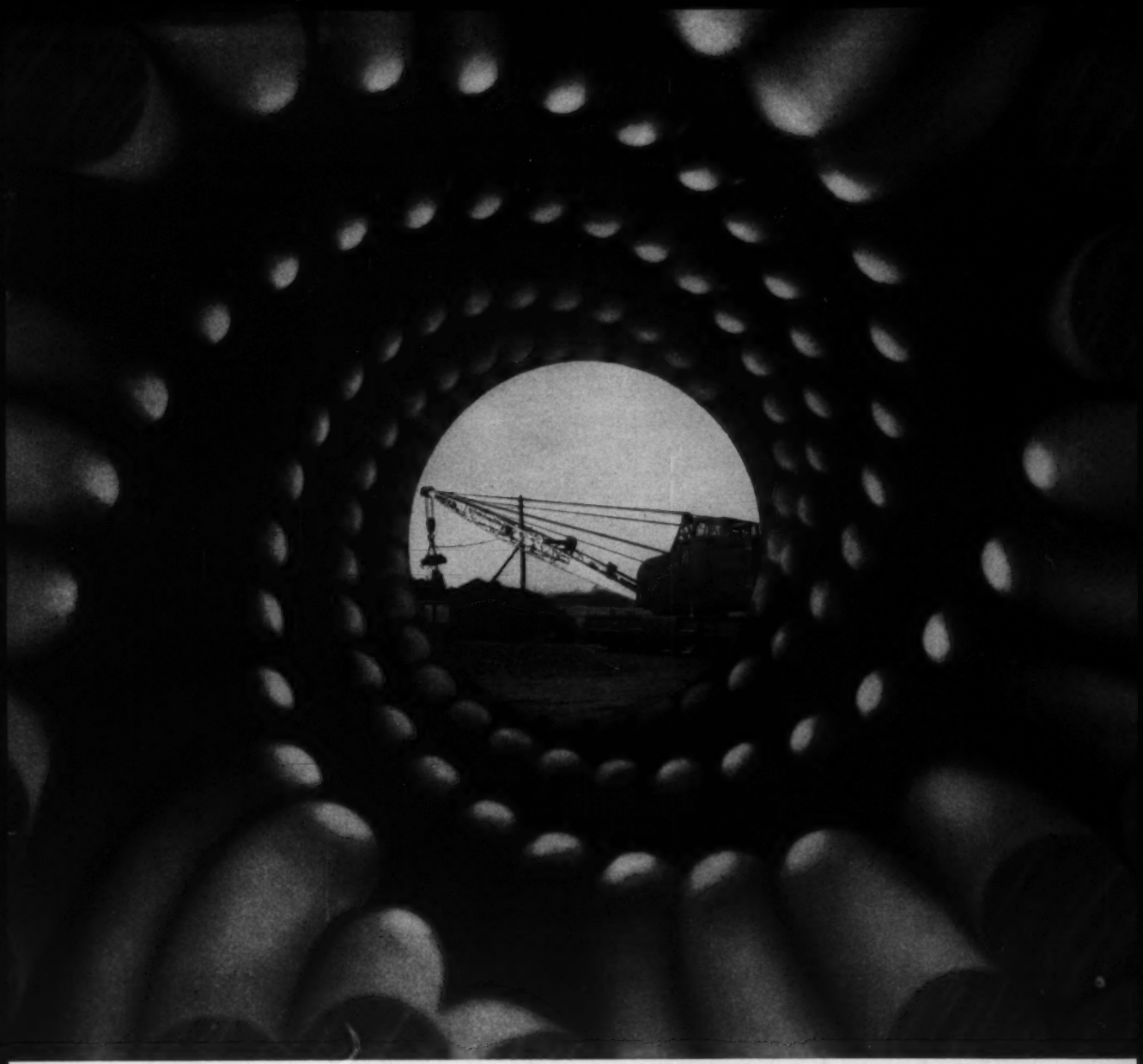
- PERM-A-CLOR NA (Trichlorethylene)
- Solvent Degreasers
- Ultrasonic Equipment
- Industrial Washer
- Phosphate Coating Compounds
- PAINTBOND Compounds
- Aluminum Treating Compounds
- Alkali and Emulsion Cleaners
- Rustproofing Materials
- Extrusion and Drawing Compounds
- Spray Booth Compounds

Write for Dr. C. E. Kircher's informative article: "How to Get the Most Out of Solvent Degreasing".

DETREX CHEMICAL INDUSTRIES, INC.

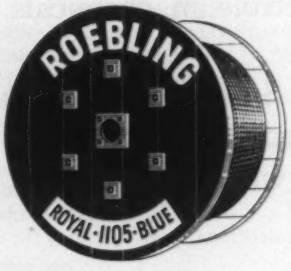
Box 501, Dept. S-1160, Detroit 32, Michigan

World's Largest Exclusive Producer of Cleaning Chemicals and Equipment



ROEBLING ROYAL BLUE WIRE ROPE

WE PUT A LOT OF WORK INTO IT—YOU GET A LOT OF WORK OUT OF IT



This happens to be the inside view of Roebling Royal Blue — its core has been removed to show the uniformity and symmetry of the rope structure. You see how concerned we are with internal security.

We have to be. To make sure that Royal Blue will live up to the day-to-day demands made upon it. High stresses and unavoidable overloads, abrasion, fatigue, impact, crushing, sheave pressures and abusive drum-winding, to name the major ones.

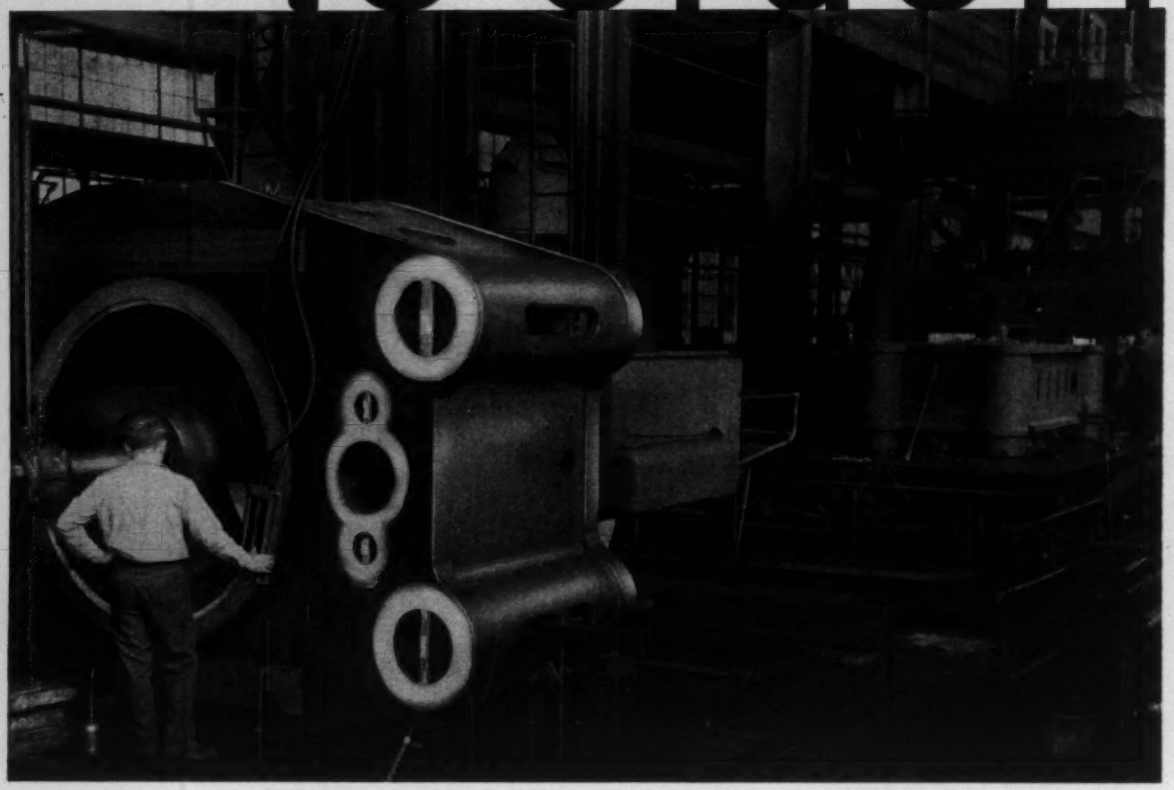
Royal Blue goes through many inspections and tests—both internal and external —before reporting to work. This way we're sure that the rope we build will do what we sell it to do. These quality-control measures are your assurance that Royal Blue is made to save you money — anyway you look at it.

For details about hard-working Royal Blue, ask your wire rope distributor or write Roebling's Wire Rope Division, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities • John A. Roebling's Sons Division • The Colorado Fuel and Iron Corporation

Build exactly what you want • • • to order!



VERSATILITY—that's the word for Sun Ship. And that's why you get the machinery or industrial equipment you need, built exactly to your requirements, when you specify Sun Ship.

Consider, for example, the machining operations shown above. To the left is a press cylinder being machined on a 72″ Draw-shaper and to the right is a large platen on a 14′ wide Planer. Here we custom-produce a wide variety of machinery or machine components to do difficult jobs in petroleum, chemicals, atomic power—in many fields.

If you would like to investigate the advantages of Sun Ship machine building service, why not contact our Sales Engineering Department now? For information and data on any phase of our service, simply write

Sun

SHIPBUILDING & DRY DOCK COMPANY

ON THE DELAWARE • SINCE 1916 • CHESTER, PA.

Order ALCOA ALUMINUM FASTENERS from your Yellow Pages!

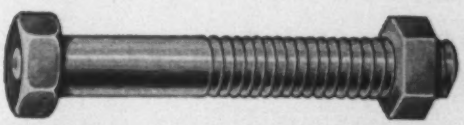
. . . save time and money

It's a fact. In the Yellow Pages of your phone book you'll find a local distributor of Alcoa® Aluminum Fasteners. He maintains full stocks—aluminum bolts, nuts, rivets, machine screws, wood screws, sheet metal screws, washers, any aluminum fastener you need.

No need to stock a lot of fasteners yourself. No need to run short, either. Your local Alcoa distributor offers the largest line of aluminum fasteners available today. So, besides the *other* advantages of using Alcoa Aluminum Fasteners—to cut your production costs, and improve product appearance, and boost product performance—you can simplify your inventory control.

Alcoa Aluminum Fasteners are corrosion resistant, have full threads, no burrs, and are produced from fully heat-treated, high-strength alloys. And one thing more! You'll get *full count* every time, exactly what you order.

If you'd like more information or free samples, mail the coupon!



Aluminum Company of America
2001-L Alcoa Building, Pittsburgh 19, Pa.

Please send me complete specification data and samples of Alcoa Aluminum Fasteners.

NAME_____ TITLE_____

COMPANY_____

STREET ADDRESS_____

CITY_____ ZONE____ STATE____

ALCOA ALUMINUM

ALWAYS FASTEN ALUMINUM WITH ALCOA ALUMINUM FASTENERS

Champion Upset Forgings Cut Valve Manufacturer's Finished Cost 30%!

At first glance this valve part looks like a typical screw machine product. But see that big wad of metal on the end of the stem? . . . It's the tip-off that you can save money with an upset forging.

Any automatic screw machine part must start with stock of the largest part diameter and be worked down . . . with considerable waste.

In upset forging, you generally start with the smallest diameter and increase the part size to the largest diameter . . . with almost no waste. Forging also increases strength, by directioning grain flow in the metal.

If you're using similar parts, check with Champion and see how much you too can save by starting with an upset forging.

THE CHAMPION RIVET COMPANY
T. P. Champion, President
CLEVELAND 5, OHIO • EAST CHICAGO, INDIANA

When it's a vital part, better make it FORGED

STEELMAKING AT JESSOP

175,000 pounds x 150 mph = shock treatment

The powerful jet engines whine in reduced-throttle restraint as the big, sleek aircraft maneuvers gracefully in its approach pattern.

In the cockpit, the crew goes through a check list. At one point the wheels are lowered and three green lights appear, indicating the gear is in position.

Then, a moment later, the pilot eases the 175,000 pound aircraft traveling 150 miles per hour onto the concrete—safely, surely, with confidence.

Probably, the steel in the landing gear was forged by Steel Improvement & Forge Company of Cleveland. For those components that bear the brunt of the impact, Steel Improvement purchases a Macro-Clean alloy made exclusively by Jessop at its Green River plant.

Only Jessop has it, this tough, sound-centered Macro-Clean alloy that takes in stride the transverse shock imposed on aircraft landing gear.

And the excellent physical properties inherent in Macro-Clean alloys make them ideally suited for numerous other applications too—crankshafts, gears of all kinds, pellet mills, driveshafts, large bearings and oil field goods for example.

Call any of Jessop's 23 sales offices in North America for Macro-Clean aircraft and forging quality alloys and a full range of specialty steels.

Jessop Steel Company
Washington, Pennsylvania

Plants and Service Centers:
Washington, Pa. • Los Angeles • Chicago • Detroit • Owensboro, Ky. • Wallaceburg, Ont.

JESSOP

honesty

the bees and the drones

Some bees built their comb in a hollow tree, but the drones took possession and claimed it for their own. The case was brought before the wise old wasp, who was to judge the rightful owner. // "The only way to be sure who is the owner," ruled the wasp, "is for each party to build a new comb. Whoever makes a comb most like the one in dispute, is the real owner." The bees agreed, but the drones refused. // The wise wasp then handed down his verdict: "It is clear now who made the comb, and who cannot make it. It belongs to the bees."

moral: Trial is the best test of performance.

We'd like you to give Hydro-Line cylinders a trial. They don't mind hard work. In fact, these heavy-duty cylinders are designed especially for hydraulic applications to 5000 psi, air operations to 200 psi.

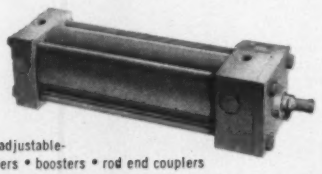
Whatever you are building, there is a Hydro-Line cylinder to help your machines complete the job more efficiently. Standard stock cylinders usually will be your best decision. They have all catalog stock dimensions, give you 10% price savings over custom cylinders, and are delivered "off the shelf."

Of course, if you need a modified cylinder, your Hydro-Line representative will help you judge the proper cylinder design for the particular job. Either way, you can be sure the right cylinder design is helping you increase productivity.

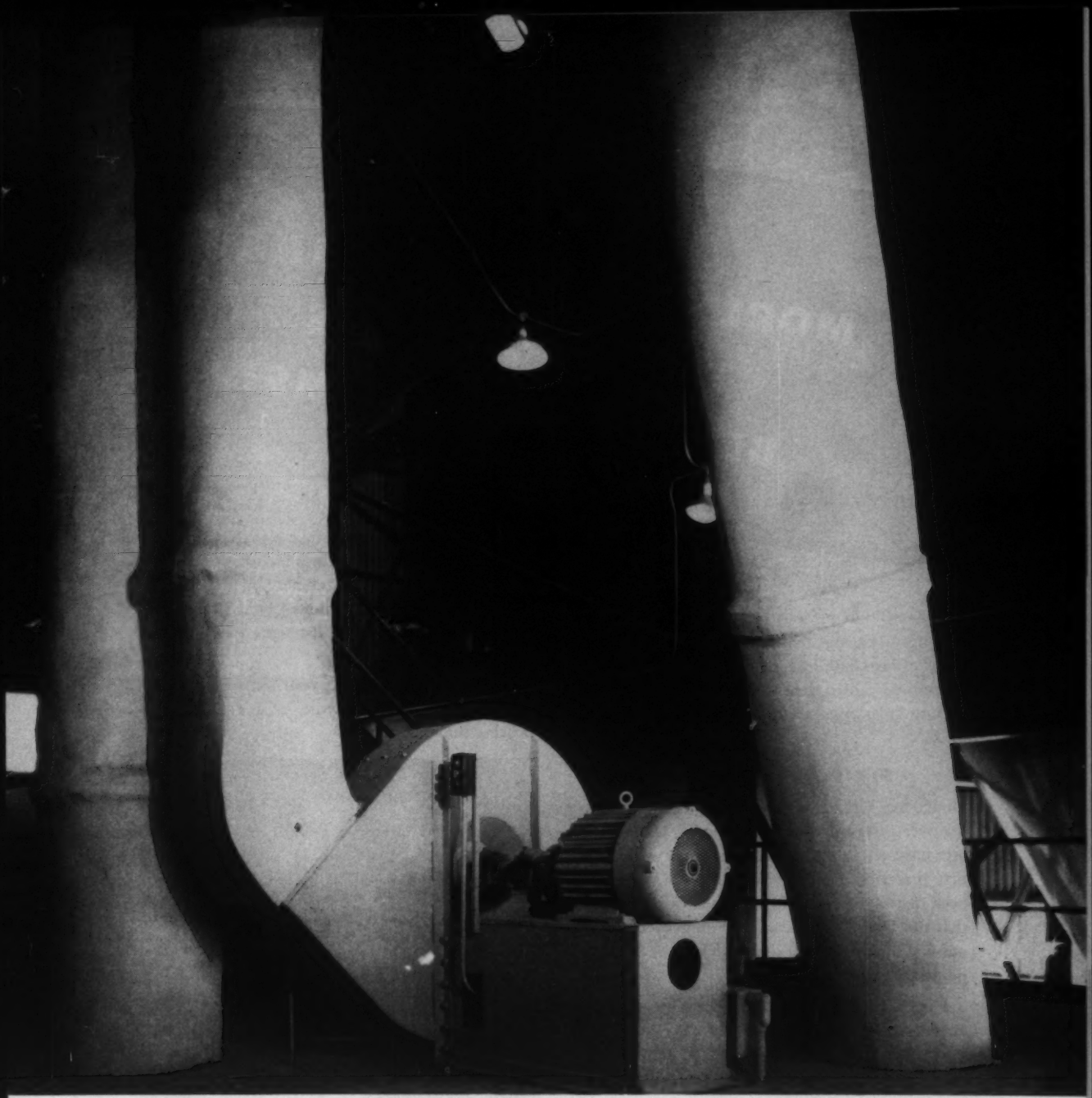
Look in *Sweet's Product Design File* for standard dimensions of stock cylinders and the address of your nearest Hydro-Line representative. Then ask him for the cylinder design that belongs on your machines. Or, phone TRemont 7-5758 to contact the factory.

HYDRO-LINE

HYDRO-LINE CYLINDERS



5604 PIKE ROAD, ROCKFORD, ILLINOIS, manufacturers of:
high- and low-pressure hydraulic cylinders • heavy-duty air cylinders • adjustable-stroke cylinders • dispensing cylinders • intensifiers • single-acting cylinders • boosters • rod end couplers



CENTURY MOTORS DRIVE PULVERIZING MILL VENT FANS

At a plaster board plant in Georgia, Century motors are providing dependable power to drive two large vent fans on roller-type pulverizing mills. The mills crush walnut-sized rock into talcum-like powder for the manufacture of dry-wall panelling and plaster.

Two Century 30 horsepower, totally enclosed, fan-cooled motors drive the vent fans. These fans provide critical air circulation for separating air from the finely-ground powder in the cyclone. The high reliability of the Century TEFC motors helps insure the availability of these important vent fans.

For applications where abnormal quantities of dust, grit, oil or chemical fumes are present, Century TEFC motors are ideal. Their totally enclosed, fan-cooled feature makes them dust-proof, cuts maintenance costs.

Century Electric application engineers have years of experience in applying the right motor for the job. This is your assurance of getting *more* than just a motor.

CENTURY ELECTRIC COMPANY

St. Louis 3, Missouri *Offices and Stock Points in Principal Cities*

Century

60-7

DODGE HAS MORE PROVED BEARINGS THAN YOU HAVE BEARING PROBLEMS!

It pays to buy from a line of stock bearings—bearings that have been proved in thousands of installations similar to yours. You benefit by getting known dependability; and you get the important savings of high quality at production price.

PIN-POINT SELECTIVITY

Dodge has supplied mounted bearings to industry for over three-quarters of a century. Dodge bearings have always kept pace with improved production practices. Each new condition of service has been met by Dodge as it has arisen, with the result that the Dodge line contains mounted bearings to meet almost every service requirement with pinpoint accuracy.

High load, high speed, excessive dust, moisture, corrosion, high or low temperatures, continuous operation—you name it!—such conditions and their combinations are met every day with Dodge bearings.

BROAD LINE—WIDELY DISTRIBUTED

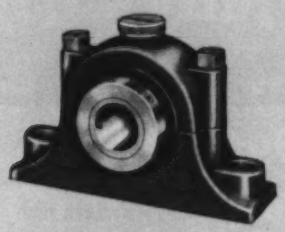
In the great variety of mounted bearings developed by Dodge, you will most likely find the precise unit to fit your requirements ideally—without paying for features you do not need. And if your requirements call for several types of bearings, there is an advantage in having them of common design, such as Dodge offers.

The Dodge line is probably broader than any other line of mounted bearings in America. And of special importance to machinery manufacturers, it is the most widely distributed line. There is always a Dodge bearing of the right type and size near at hand.

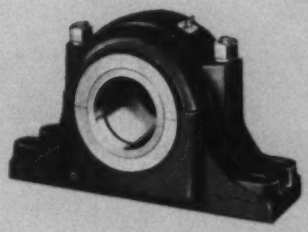
You can check this with your local Dodge Distributor. Ask him—or write us for the Dodge Bearing Bulletin.

In addition to tapered roller, spherical roller and ball bearings, Dodge builds many types of sleeve bearings. Here is the "large and small" of the sleeve type bearings carried in stock—ranging from an 8-in. Sleevoil weighing over 1200 lbs. to a ½-in. solid journal bearing weighing 9 ounces.

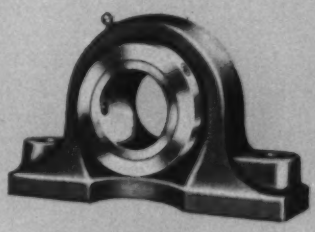
DODGE MANUFACTURING CORPORATION, 4400 Union Street, Mishawaka, Indiana



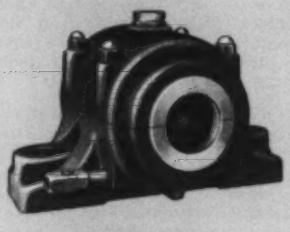
DODGE PILLOW BLOCKS WITH TIMKEN TAPERED ROLLER BEARINGS



DODGE SPHER-ALIGN PILLOW BLOCKS WITH SPHERICAL ROLLER BEARINGS

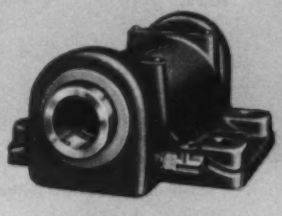


DODGE BALL BEARING PILLOW BLOCKS



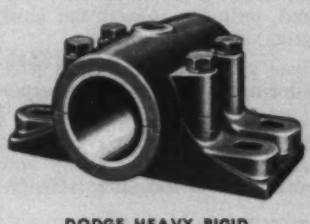
DODGE SLEEVOIL PILLOW BLOCKS

DODGE BRONZOIL PILLOW BLOCKS

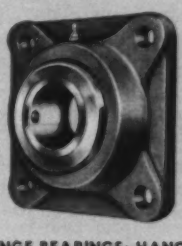


DODGE BRONZE BUSHED PILLOW BLOCKS

DODGE JOURNAL BEARINGS SOLID AND SPLIT



DODGE HEAVY RIGID PILLOW BLOCKS



FLANGE BEARINGS: HANGER BEARINGS: BEARING UNITS: TAKE-UPS

● **Dodge Pillow Blocks with Timken Tapered Roller Bearings.** America's quality pillow blocks. Assembled, lubricated, adjusted and sealed at the factory. 5 types for varying needs.

● **Dodge Spher-Align with Spherical Roller Bearings.** Rugged heavy duty, compact, inherently self-aligning. Exclusive Micro-Mount simplifies installation.

● **Dodge Ball Bearing Pillow Blocks.** Deep groove ball bearings with long inner races—high capacity. SL, SC and SCM models for light, normal and medium service respectively.

● **Dodge Sleevoil Pillow Blocks.** Ultra quality . . . extra long life . . . accessibility . . . *quiet*. Plain or water-cooled.

● **Dodge Bronzoil Pillow Blocks.** Efficient, low cost pillow blocks with self-oiling, capillary bronze bushings. Self-aligning. Large oil reservoirs.

● **Dodge Bronze Bushed Pillow Blocks.** Quiet fan and blower pillow blocks with two bronze bushings of high lead content mounted in one cast iron housing.

● **Dodge Journal Bearings — Solid and Split.** True running, dependable. Babbitted bearings with precision machined bores and faces. Finished bases.

● **Dodge Heavy Rigid Pillow Blocks.** Rugged, carefully bored, babbitted pillow blocks for many applications requiring grease lubrication. Finished bases and ends.

● **Bearing Units.** A wide variety—spherical seat, cartridge, flange, hanger, screw conveyor hanger, take-up. Ball, Roller and Sleeve types.

CALL THE TRANSMISSIONEER—your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look under "Dodge Transmissioneer" in the *white* pages of your telephone directory, or in the yellow pages under "Power Transmission Machinery."

DODGE

of Mishawaka, Ind.

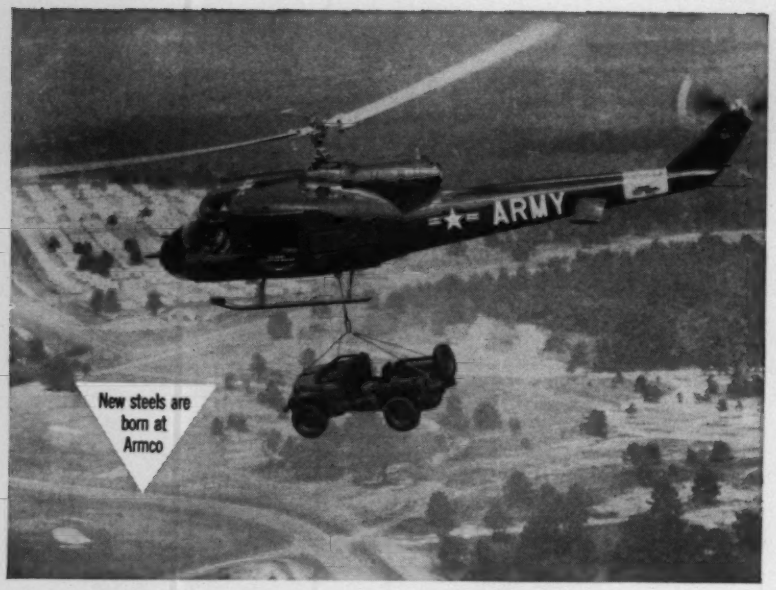


Photo Courtesy Bell Helicoptor Corporation, Ft. Worth, Texas

TUFFY GIVES SLING USERS A "LIFT"

in operating efficiency and economy

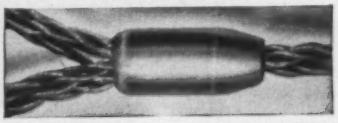
What else gets a lift with Tuffy? Just about everything. In every industry where loads are lifted, lowered, pulled or towed. On land and sea and even (as the picture suggests) in the air.

Jobs done by slings and hoist lines vary greatly. That's why Tuffy engineers have specialized in tailoring Tuffy products to specific uses.

Because of this specialization, Tuffy assures you the right sling for the job. Gives you better sling performance, greater safety and longer service life. In the long run, the ultimate low cost sling is Tuffy.

Don't take less than these Tuffy advantages . . .

Tuffy's secret of longer life: patented 9-part machine-braided fabric. It provides a combination of flexibility and strength never achieved by ordinary wire rope. Amazing resistance to kinks, which smooth out easily when they do occur.



An eye for strength and safety: Tuffy's metal ferrule gives the eye splice full strength of the fabric. That's because it's pressed on under tremendous hydraulic power. What's more, the smoothly tapered body won't snag hands. A Tuffy extra at no extra cost.

Get in Touch with Your Tuffy Distributor

Whether your sling jobs call for the Tuffy machine-braided sling, or Union's new 6- and 8-part hand-braided slings, your Tuffy distributor gives you by far the best buy. And he's famous for fast service on every sling and wire rope need. Look him up in the Yellow Pages.

Tuffy® Tips

—on safe use of

Slings and Hoist Lines

Lifting Strains Take High Toll of Injuries

Did you know that in some states one of every six compensation claims involves back injuries? And that one major insurance company says back injuries constitute 60% of their claim expense?

Hernia is another hazard of materials handling. One manufacturer reported 75% of his compensation claims involved hernias. This high incidence of hernias and back injuries can be greatly reduced by proper lifting equipment and methods.

How to Play It Safe When Loading Slings and Hoist Lines

1. Keep pull on sling legs in a straight line never shorten legs with knots or I-bolts. If choker and basket hitches are used on slings, check rated load limits.
2. Load slings on the center of hooks. Never at their points, except for hooks specially designed for point loading.
3. Never use load hooks that are bent open. They have been overloaded, and may drop loads with disastrous results. Same goes for defective chain blocks. Insist that your men report them at once.
4. Lubricate wire ropes at regular recommended intervals, with lubricant advised by your local oil company engineer.

FREE!
New Tuffy
Sling Handbook

All about slings from A to Z, including types, dimensions and rated loads. Address **Union Wire Rope Corporation, 2160 Manchester Ave., Kansas City 26, Missouri.** Specialists in high carbon wire, wire rope, braided wire fabric, and stress relieved wire and strand.

6

UNION Wire Rope

ARMCO®

Subsidiary of ARMCO STEEL CORPORATION

OTHER SUBSIDIARIES AND DIVISIONS: Armco Division • Sheffield Division • The National Supply Company
Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Southwest Steel Products

FALK and STEELFLEX are Registered Trademarks

Cut disconnect-reconnect time by as much as 50%

The FALK Spacer Coupling is specially designed for quick installation or removal *without disturbing the driving or driven unit.* This feature can save you up to 50% in disconnect-reconnect time when critical equipment—a process pump, for example—needs repair or replacement.

Here's another saving: with the FALK Spacer Coupling, you can quickly realign shafts *without the usual loss of operating temperature!*

And still another: you can remove or reinstall the FALK Spacer as a unit *without draining the lubricant.*

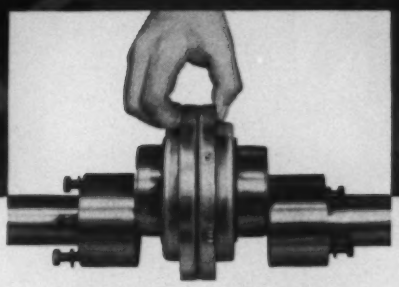
Because of its exclusive grid-groove Steelflex design, the FALK Spacer can accommodate residual misalignment—parallel, angular, or (most important) *both.* Also, it provides torsional resiliency that cushions shock and vibration. Thus it saves wear-and-tear on your connected equipment.

To prove these claims and enjoy these savings, install a FALK Spacer on one application—and see for yourself. Consult your FALK Representative or Authorized Distributor.

THE FALK CORPORATION, MILWAUKEE 1, WISCONSIN

MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS

Representatives and Distributors in many principal cities.

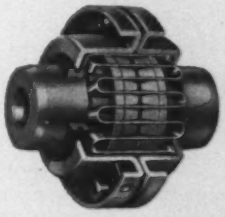


EASY AND QUICK TO INSTALL, DISCONNECT OR RECONNECT

First, mount shaft hubs to allow proper distance between hubs; then, align driving and driven units.

Second, compress Spacer to fit space between hubs and tighten cap screws to pull spacer hubs into the registered fit.

To disconnect, reverse the second step. No draining of lubricant necessary.



The heart of the FALK Spacer ...the basic Type F Steelflex

Write for Service Manual 4838

FALK

...a good name in industry

"When we put in the Payroll Savings Plan...

"It fitted into our operation perfectly...

"I had an idea it might be a bit complicated to install the Payroll Savings Plan. Seeing all our people, explaining how it operates, pointing out its advantages. But the way it worked out it was simplicity itself.

"All we did was contact our State Savings Bonds Director. He outlined the campaign for us, working through the bond officer we appointed. A short, company-wide person-to-person canvass was set up—and the results were absolutely amazing. Some of our people told us later that since they found out how convenient it is to save *regularly* through the Payroll plan they have actually increased other investments, too!"

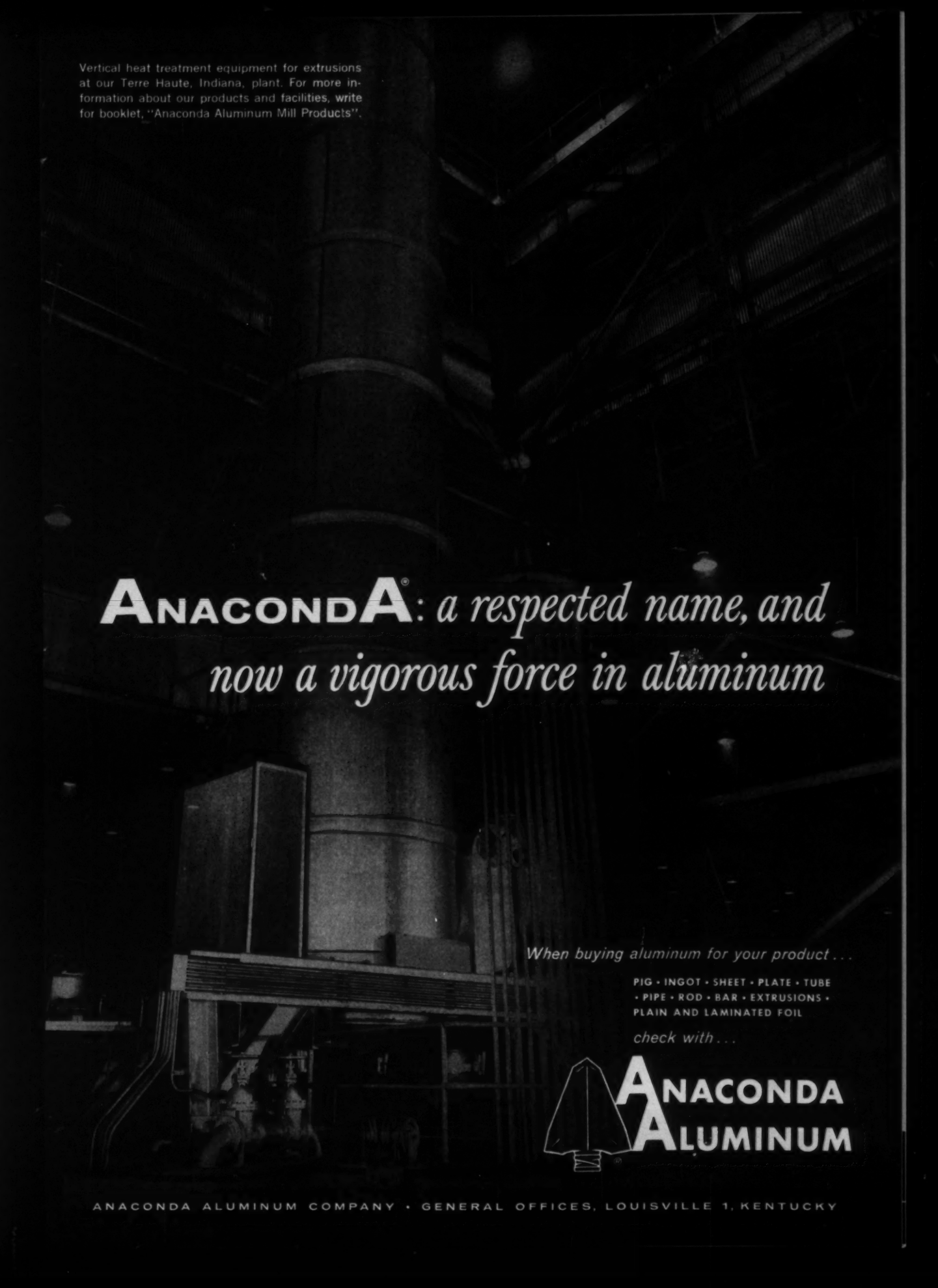
When your company has a flourishing Payroll Savings Plan for U.S. Savings Bonds, participating employees have the added satisfaction of helping to keep America strong.

For prompt, friendly help in setting up a Payroll Savings Plan in your organization, contact your State Savings Bonds Director. Or write Savings Bonds Division, U.S. Treasury Department, Washington, D.C.

ALL U.S. SAVINGS BONDS—OLD OR NEW—EARN ½% MORE THAN BEFORE

STEEL
The Metalworking Weekly

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTISM, THE ADVERTISING COUNCIL AND THE DONOR ABOVE.



Vertical heat treatment equipment for extrusions at our Terre Haute, Indiana, plant. For more information about our products and facilities, write for booklet, "Anaconda Aluminum Mill Products".

ANACONDA®: *a respected name, and now a vigorous force in aluminum*

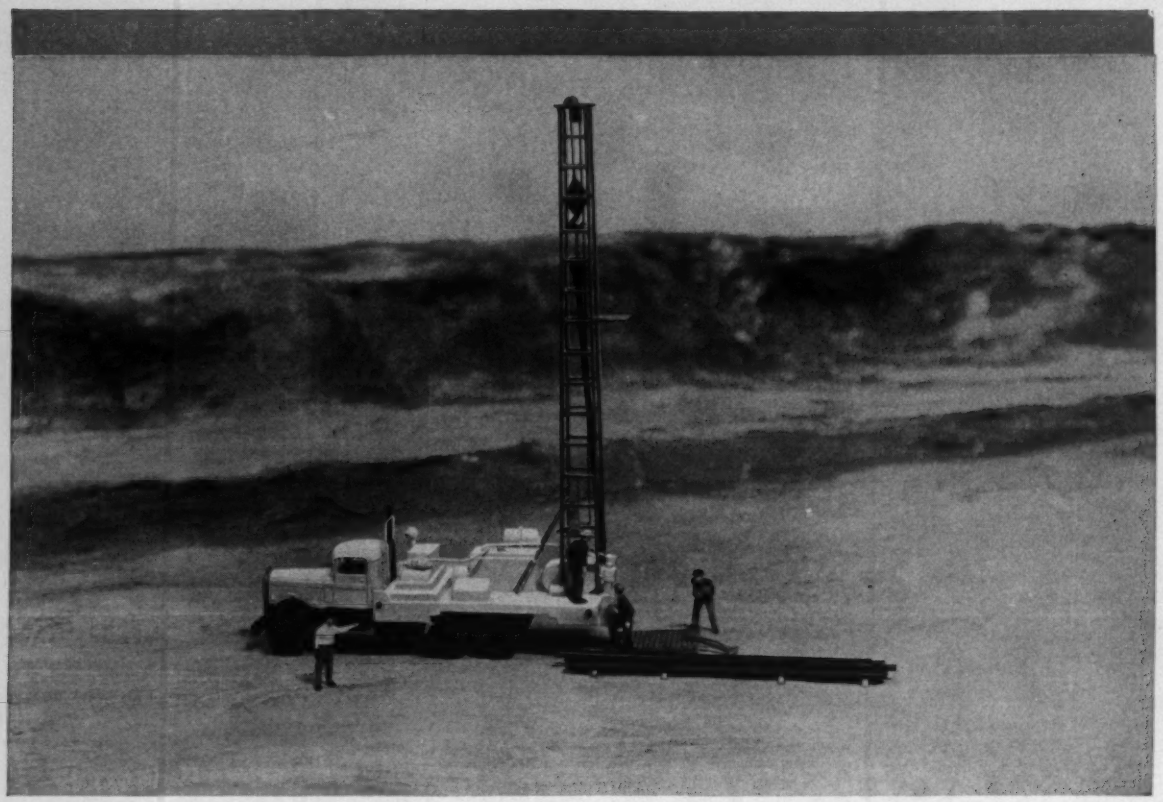
When buying aluminum for your product . . .

PIG • INGOT • SHEET • PLATE • TUBE • PIPE • ROD • BAR • EXTRUSIONS • PLAIN AND LAMINATED FOIL

check with . . .

ANACONDA ALUMINUM

ANACONDA ALUMINUM COMPANY • GENERAL OFFICES, LOUISVILLE 1, KENTUCKY



Down-to-earth reasons for using Custom Quality OHIO Tubing

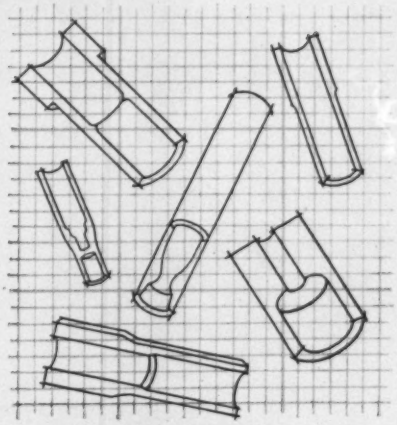
As in rotary drilling, which uses steel tubing internally upset by Ohio Seamless, greater strength and lighter weight may be important in your product.

So before selecting a tubing source consider these important facts. OHIO Tubing is always the exact tubing you need for your product because OHIO Tubing is CUSTOM MADE for your product. Your order is manufactured to your own specifications to produce steel tubing especially for your application — the precise grade, analysis, size, shape, special anneal and tolerances best suited to your needs.

Ohio Seamless Tube produces both seamless and electric welded steel tubing — is prepared to form many finished or semi-finished tubular parts to your designs.

To get the most from your next steel tubing order, use Custom Made OHIO Tubing. Contact your nearest Ohio Seamless representative, or send part drawings to the plant at Shelby, Ohio — Birthplace of the Seamless Steel Tube Industry in America. A-3061A

Model illustrated built to 3.5 mm scale.



Typical Ohio Seamless tubular upset forgings

OHIO

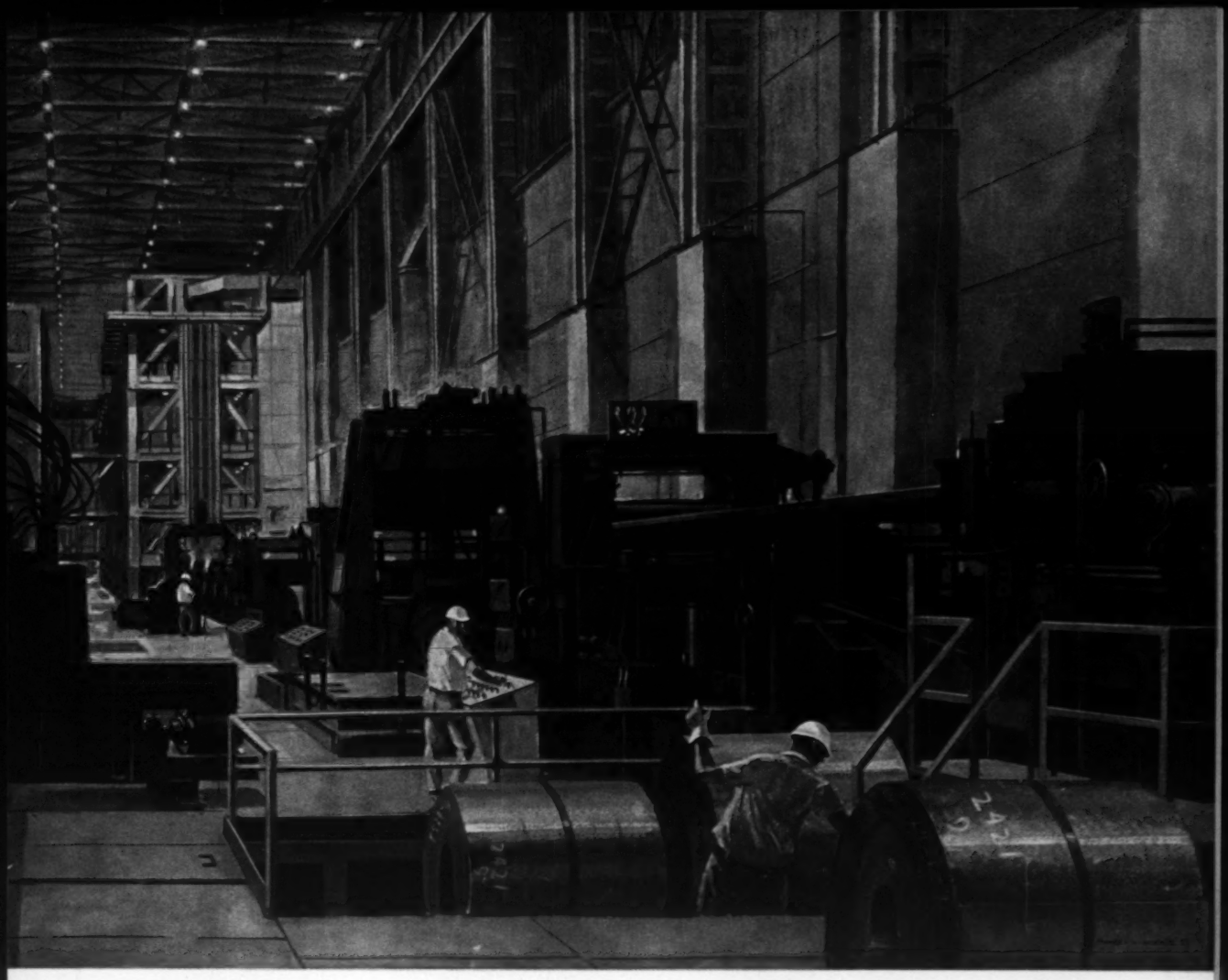
OHIO SEAMLESS TUBE

Division of Copperweld Steel Company • **SHELBY, OHIO**

Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging

SALES OFFICES: Birmingham, Charlotte, Chicago (Oak Park), Cleveland, Dayton, Denver, Detroit (Huntington Woods), Houston, Kansas City, Los Angeles (Lynwood), Miami, Moline, New York, New Orleans (Chalmette), Philadelphia (Wynnewood), Pittsburgh, Richmond, Rochester, St. Louis, St. Paul, Salt Lake City, Seattle, Tulsa, Wichita

CANADA: Railway & Power Engr. Corp., Ltd. • EXPORT: Copperweld Steel International Company, 225 Broadway, New York 7, New York



Entry end of No. 4 continuous galvanizing line, Weirton Plant, Weirton Steel Company

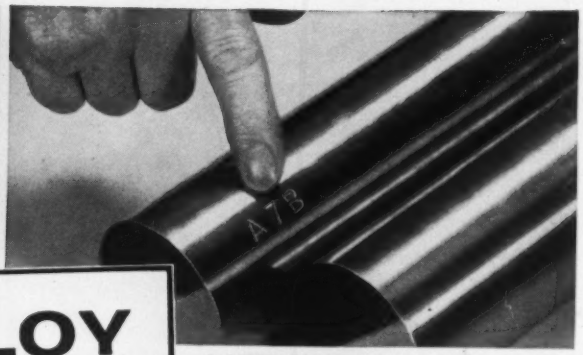
Wean, Weirton and Galvanizing . . .

Weirton Steel Company, Division of National Steel Corporation, added this continuous hot-dip galvanizing line to meet the demand by customers for fine quality zinc-coated sheet. This line was specifically designed to process heavy gauge strip in widths up to 50″, extending Weirton's coverage of finished sizes.

The Weirton line handles 65,000 pound coils and provides for either recoiling or shearing operations at the exit end. Shear lengths vary from 48″ to 192″. A horizontal cleaning section provides superior cleaning of the strip. Six bridles maintain continuous tension regulation throughout the line, permitting a wider range of gauges. Weirton's new galvanizing line is an example of Wean's *creative engineering*, oriented to solving a company's expansion needs. Why not take advantage of Wean's years of experience in your planning to meet expanding demand for galvanized products.

THE WEAN ENGINEERING COMPANY, INC. • WARREN • OHIO

WIDEST SELECTION—You choose from the nation's largest and most diversified alloy steel stocks at Ryerson—available to meet even your largest requirements.



8-STEP CERTIFICATION—Our unique 8-Step Certified Alloy Plan assures test-proven quality and predictable performance every time . . . guides heat-treatment . . . cuts reject loss.

ALLOY STEELS

in Stock at Ryerson

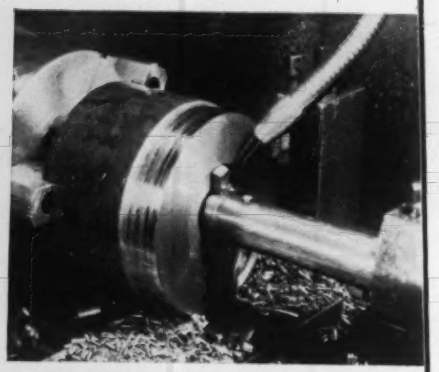
BARS

Hot rolled and cold finished

Low Carbon Case Hardening	4615/20
	E8615
	8620
	8620 leaded
	E9310
	Nitralloy 135 modified
Heat-Treated Medium Carbon	4140
	4140 TG & P
	4140 leaded
	4147/50 leaded
	4340
	Rycrome®
	Rycrome TG & P
	Nikrome®
	Nitralloy
Medium Carbon Annealed Direct Hardening	4140
	4140 leaded
	4147
	4147/50 leaded
	4340
	E6150
	8647 leaded
Rycut Free Machining	Rycut® 20
	Rycut 40 and 50 annealed
	Rycut 50 modified annealed
	Rycut Heat-Treated

PLATES

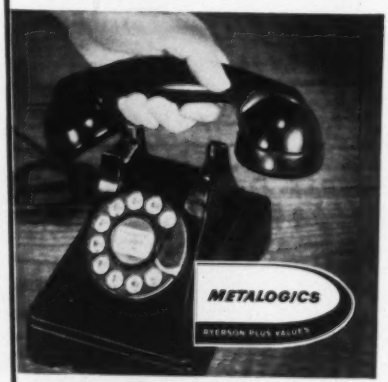
8620	T-1
E8615	Aircraft Quality
4140	4130 & E4130



WORLD'S FASTEST CUTTING . . . that's Ryerson's Rycut series of alloys (see listing). And Rycut heat-treated has carbon matched to bar size for best combination of machinability and strength.

TECHNICAL HELP—Your Ryerson representative is Metalogics-trained to suggest the best alloy for each application . . . steels to do the job faster, better—at less cost.

DEPENDABLE DELIVERY—Big-capacity facilities and an experienced staff with a service attitude assure quick delivery of any quantity—within hours if needed.



BE "METALOGICAL"—All the plus values of Ryerson service on alloy steel add up to the Ryerson science of giving you "optimum value for every purchasing dollar." So be "Metalogical"—call Ryerson.

METALOGICS
RYERSON PLUS VALUES

STEEL • ALUMINUM • PLASTICS • METALWORKING MACHINERY

RYERSON STEEL

Joseph T. Ryerson & Son, Inc., Member of the INLAND® Steel Family

PLANT SERVICE CENTERS: BOSTON • BUFFALO • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DETROIT • HOUSTON • INDIANAPOLIS
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STEEL The Metalworking Weekly

Metalworking Week®

November 14, 1960

How Third Quarter Profits Compare

The First National City Bank of New York analyzed 764 corporate reports to gage the extent of the downturn in net profits. The first figure given (below) is the percentage change in the third quarter of 1960 vs. the second quarter. The second figure is the change in 1960's first nine months vs. 1959's first nine months.

Total	−11	−2	Autos & parts	−67	−8
All manufacturing	−12	−3	Other transportation equip.	†	−76
Iron & steel	−50	*	Other metal products	+3	−15
Electrical equipment	*	−7	Mining & quarrying	−21	+13
Machinery	−2	−3	Railroads	−47	−24
Nonferrous metals	−12	−10	Tires, rubber products	−20	−9

*Increase of less than ½ of 1 per cent. †Increase of more than 100 per cent.

PAs Lack Optimism

The latest survey by the National Association of Purchasing Agents finds: October production held at the September level, while new orders declined slightly . . . Employment will hold at current levels till yearend . . . The pace of inventory liquidation is slowing, but the trend continues . . . A trend to price cutting appears to have replaced the firming trend that had just begun.

GM Exec Predicts 9.5 Million Vehicle Market by 1970

Frederic G. Donner, chairman, General Motors Corp., looks for a market for 9.5 million cars and trucks by 1970. He says population will have risen by 20 per cent and the gross national product will be around $700 billion. The average family will have 15 per cent more purchasing power than today. So more families will own two cars. That "will bring a normal domestic market for new passenger cars of about 8 million units plus nearly 1.5 million trucks," he says.

Inland Promotes Sales of Metal Cans

Inland Steel Co. got 2398 requests for its "Sandwich Month," in-store merchandising kits promoting food and soft drinks in cans. Total pieces of promotional material exceeded 170,000. It's another step in the steel industry's efforts to present its sales story to the ultimate consumer.

NICB Survey Finds Mixed Outlook

A National Industrial Conference Board survey of 173 manufacturers finds 4 in 10 expect new orders and pretax profits to be higher in 1961's first half than in the first half of 1960; 1 in 3 firms expects a decline. More than 2

Technical Outlook—Page 111 Market Outlook—Page 145

in 3 firms report inventories are larger than at this time a year ago. About 1 in 4 firms say their capital outlays in 1961's first half will be higher than their average for 1960; 1 in 3 firms look for a cutback.

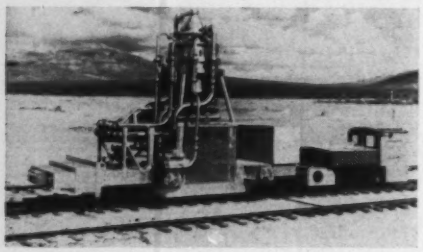
U. S. Steel Launches New Consumer Campaign

In another campaign promoting the use of steel on the consumer level, U. S. Steel Corp. last week had Mrs. Rosemary Murphy (photo), Mrs. America of 1961, and other celebrities at Cleveland's Higbee Co. The initial "Rhapsody of Steel" exhibition, first of many to be held across the nation, featured home displays, demonstrations, and fashion artistry showing thousands of uses for the thousands of different steels on the market.

Bethlehem to Build in Indiana?

Gov. Harold Handley is optimistic that Bethlehem Steel Co. will construct a plant near Indiana's proposed deep water port on Lake Michigan. The governor flew to Bethlehem, Pa., to confer with company officials and keep them up to date on the port project. Bethlehem officials contacted by STEEL offered no comment. Two years ago, there was speculation that Bethlehem would build a sheet and tin mill in the area to enter the Chicago market.

U. S. Speeds Nuclear Rocket Program



Project Rover, the nuclear rocket propulsion program of the Atomic Energy Commission and the National Aeronautics & Space Administration, was given a design speed-up last week. NASA is notifying about a dozen firms that it wants proposals for a complete engineering, research, and development program. The feasibility of Rover appears no longer in doubt. The latest ground prototype reactor (Kiwi, in the photo) was tested successfully Oct. 19. High pressure hydrogen gas is the propellent. Plumbing remains the biggest problem industry must solve.

Five Ways to Strengthen NLRA Suggested

Stuart Rothman, general counsel, National Labor Relations Board, has suggested five methods of strengthening the collective bargaining procedures of the National Labor Relations Act: 1. Compel parties (by statute) to furnish a detailed list of proposed contract changes. 2. Require parties to state reasons for proposed changes. 3. Increase use of federal and state mediation services and demand that 60 days' notice be given. 4. Demand counter-proposals in some disputes. 5. Impose an obligation on the parties to meet in frequent or continuous sessions where an impending industry-wide strike threatens the national safety or health.

J&L Uses Computer to Control Annealing Line

Jones & Laughlin Steel Corp.'s Aliquippa (Pa.) Works is operating a General Electric digital control computer system on its new continuous annealing line in the Tin Plate Dept. The computer plots most efficient speed for the annealing line, provides instant accounting records for each coil of steel, checks for off-normal furnace practices or conditions, provides data on which operators make production decisions, provides knowledge to improve design of annealing lines, and recognizes failures in its own performance.

Kennedy Victory Lessens Chance for Depreciation Reform

Although President-Elect Kennedy has recognized the need for depreciation reform, its rank on his priority list is lower than it was on Mr. Nixon's. One development that could improve the ranking would be a strong demand for reform showing up in the Treasury Department's current depreciation questionnaire. Some 400 important companies still haven't answered it. The results will be reported to Congress early next year.

U. S. Steel Shows Transportation Designs for 1975

U. S. Steel Corp. has unveiled an array of design ideas for transportation vehicles that could be on the market 10 to 15 years from now. Among them: A two seat vehicle that would travel on air jets, a station wagon equipped with a solar furnace, an earth mover with an ultrasonic blasting device for leveling uneven terrain, ore carriers propelled by nuclear power that would move on cylinders.

India: Complex Challenge to Marketers

Like the farmer in the photo, many residents of India are modernizing. But the nation's 400 million people, living in an area one-third the size of the U. S., pose a giant marketing challenge. The *Journal of Marketing* says the average Indian spends $32 for cash purchases annually (vs. $1664 in the U. S.) . . . literacy rate is only 15 per cent . . . transportation facilities are inadequate . . . no language is common to 51 local dialects . . . And most Indians have contempt for the man seeking a profit.

L&M Sees Trend to 'Systems Marketing'

Look for more companies to adopt a concept called "systems marketing" by Lippincott & Margulies Inc., industrial design firm. Akin to systems engineering, it requires a thorough understanding of the total system before trying to design, produce, and market the bits and pieces. One implication: A move away from the "Procter & Gamble approach" of separate development, advertising, production, and merchandising for each brand, toward the "General Electric approach" in which brand names like Telechron

have been deliberately subordinated to bring about a GE identification and a favorable GE image.

UAW Voted Out of Aircraft Plant

Production workers at the Sikorsky plants of United Aircraft Corp. have voted out the United Automobile Workers as their bargaining agent. During the UAW's unsuccessful strike this summer, a group of nonunion workers began agitating for the removal action. Those workers have now formed the Independent Aircraft Guild, which claims 1000 members, and will seek recognition as the bargaining agent.

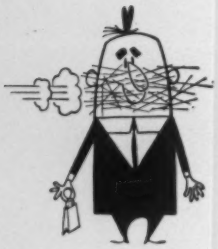
Honeywell Prexy Sees $5 Billion Market for EDP

Look for sales of electronic data processing (EDP) equipment to hit a level between $2.5 billion and $5 billion annually by 1965, predicts Paul B. Wishart, president, Minneapolis-Honeywell Regulator Co. He says the market will reach the $1 billion mark by the end of this year. Honeywell already is committed to deliver $51 million worth of EDP equipment during 1961.

Merger Trend Stays Steady

During the first nine months of this year, 776 mergers were recorded by the Federal Trade Commission (vs. 792 in the like period of 1959, 647 in 1958, and 720 in 1957). For manufacturing and mining industries, where 541 of the marriages occurred, June was the biggest month with 71 weddings.

Straws in the Wind



Stromberg-Carlson Div. of General Dynamics Corp., and Haloid Xerox Inc. have developed an electronic reading and printing system to transmit mail from one city to another in seconds . . . A Pitney-Bowes Inc. machine for transmission of mail has been put into pilot operation by the U. S. Post Office . . . Carleton Shugg, president, Electric Boat Div., General Dynamics Corp., says mechanization of production welding is imperative in our battle against foreign competition . . . U. S. exports rose slightly in September to $1.57 billion . . . The average wage hike granted by 242 Cleveland firms this year is 6.57 cents an hour, without fringes, Associated Industries of Cleveland reports.

Metalworking Pulse

The Business Trend: Cutbacks in auto and steel output and carloadings more than canceled out a gain for electricity during the week ended Nov. 5, resulting in a 2 point drop in STEEL's index. **Autos:** About 600,000 completions have been scheduled for November, nearly as many as in October. But production may fall short of the goal, as it did by 8 per cent last month. **Steel:** The gap between early 1960 forecasts and actual output continues to widen.

- **INDUSTRIAL PRODUCTION**
  Week ended Nov. 5 . . **151†**
  Year ago **111**
  Details on Page 87

- **PASSENGER CAR PRODUCTION**
  Week ended Nov. 12 . **142,000***
  Year ago **64,233**
  Details on Page 84

- **INGOT PRODUCTION RATE**
  Week ended Nov. 13 . **51.4%†**
  Week ago **51.9%**
  Details on Page 154

†Preliminary. *Estimated.

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cheaper by the slice!

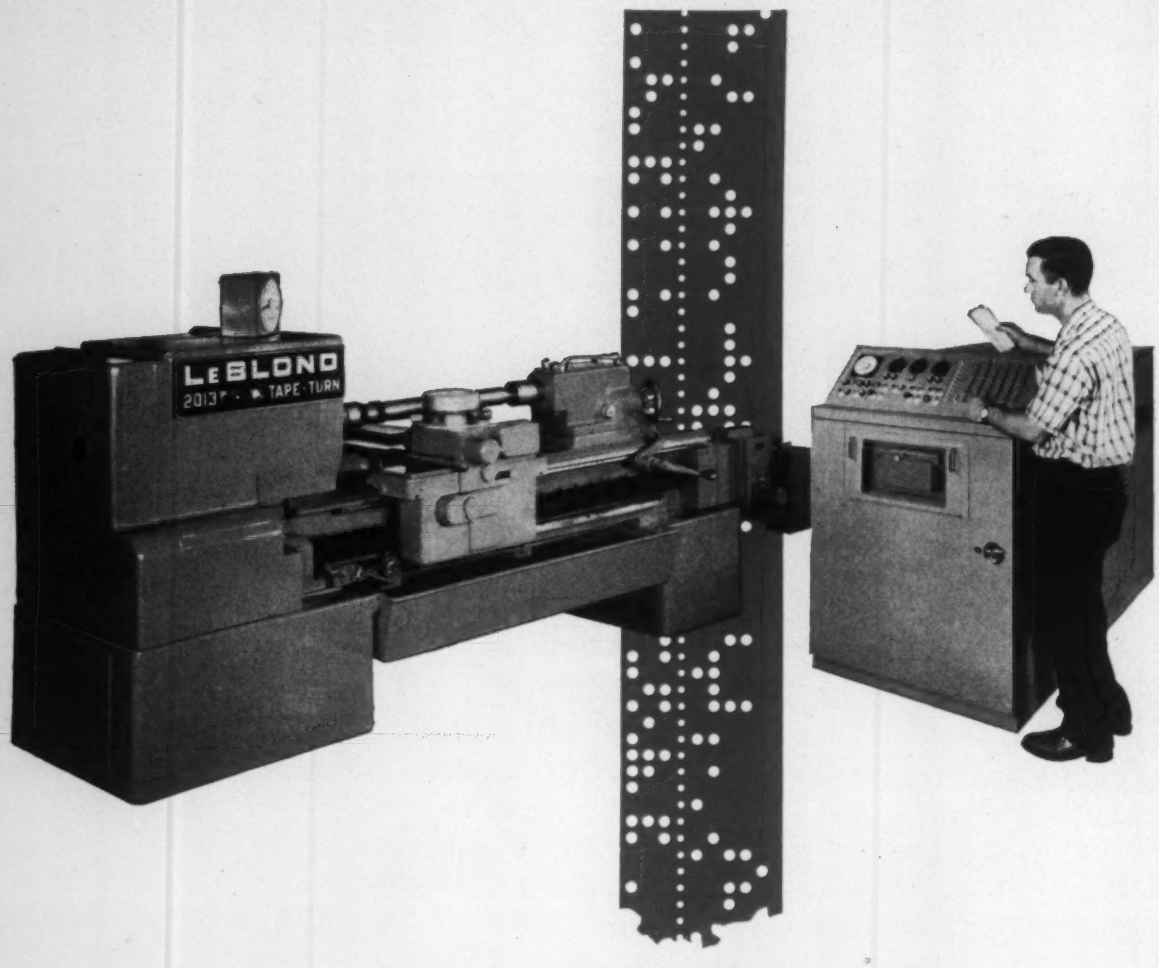
If you make parts with a hole, you can save money if you use Michigan Seamless TAILORED TUBING. Tube stock is less costly, by the slice, than a comparable piece of bar stock. When you start with tubing, the hole is already there. No drilling required. This eliminates a drilling station and saves time. Because you have no chips from the center of the part, you save on scrap and scrap handling. Michigan Seamless makes a complete selection of fine carbon and alloy steel mechanical tubing. It's TAILORED to your specifications, round or shaped, from 3/16" to 3½" O.D. Wall thicknesses range from .032" to .625". For prompt answers to questions about application of mechanical tubing, write or wire Michigan Seamless Tube Company, 402 West Street, South Lyon, Michigan.

Steel

MECHANICAL AIRCRAFT, PLAIN AND FINNED HEAT EXCHANGER TUBING

MICHIGAN SEAMLESS TUBE COMPANY/GULF STATES TUBE CORPORATION

SOUTH LYON, MICHIGAN ROSENBERG, TEXAS



TURN WITH TAPE

Do it with TAPE TURN, the lathe that turns contours by numerical control; and tapers, sharp angles, radii, facing cuts and plunge cuts besides, not to mention heavy duty straight turning. No need for handwheels and levers. This lathe takes orders remotely from standard 1" 8-channel punched tape or a convenient pushbutton keyboard.

Tape-Turn puts engineering specifications at the cutting edge. Production Control can maintain control. Command by General Electric's new Mark Century numerical control. Full zero offset. Manual overrides at the console.

Turn contoured parts like this with tape and cut costs up to 75 per cent over tracer turning. Full range of spindle speeds and horsepower, all the beef you need for heavy production turning with LeBlond Tape-Turn models in several sizes. Write for documented savings with Tape-Turn, or ask your LeBlond representative for the Tape-Turn bulletin.

LeBLOND of Cincinnati

THE R. K. LeBLOND MACHINE TOOL CO. *World's Largest Builder of a Complete Line of Lathes* MADISON AT EDWARDS ROADS, CINCINNATI 8, OHIO

Mr. Kennedy:

In the next four years, you will face some awesome problems.

One will be the preservation of the peace. Unless peace is preserved, little else matters.

But you confront another problem of equal importance—the maintenance of a vigorous and healthy domestic economy. A strong economy is essential to preserving the peace. You can't have one without the other.

We suggest three areas in which the federal government can properly help promote a vigorous economy:

1. Modernize the tax structure, with particular attention to our archaic depreciation policies. Outmoded tax policies threaten our great industrial machine. They stifle expansion. They place U. S. manufacturers at a tremendous disadvantage with foreign producers who operate under more progressive depreciation and other tax policies than we do.

2. Create a climate in which U. S. companies can participate more freely in the new world market. Take off the shackles. Tax and depreciation reform will help. Beyond that, we need better trained representatives abroad. We need sensible aid in financing, insuring, and extending credit for foreign trade. We need to integrate any foreign aid policy into our total national policy. We need greater reciprocity in import restrictions. We need better statistics and market information from overseas.

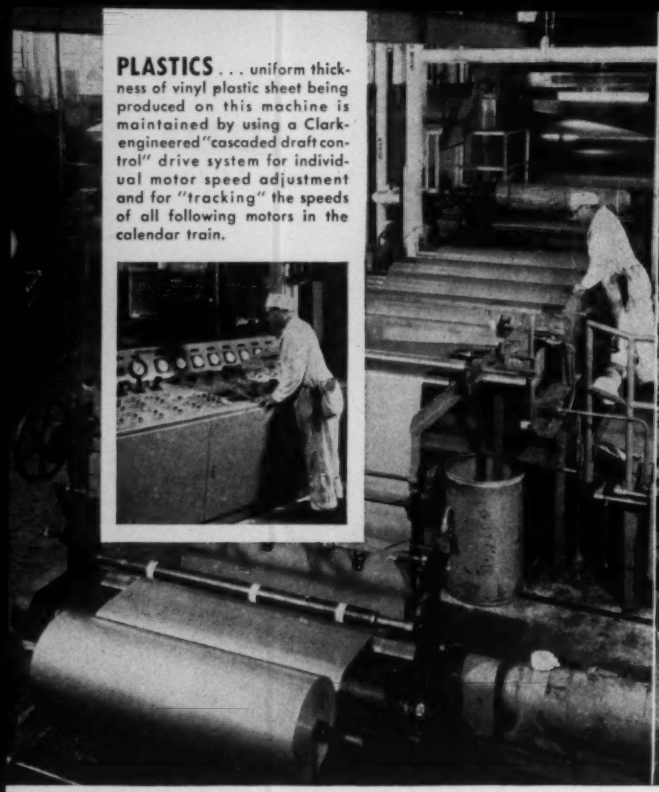
3. Encourage and aid in the greater utilization of our human resources—at all levels. We need fairness and impartiality in dealing with labor and management relations. We need to emphasize that productivity and efficiency are national needs—essential to our national preservation. We need more ready acceptance of the tools and methods that will increase our productivity. We need the elimination of work rules and practices that promote inefficiency. We may need a national policy on the retraining and replacement of people temporarily displaced as a result of technological shifts.

Wise and impartial remedies in those areas will go far in helping U. S. industry maintain a healthy and growing economy.

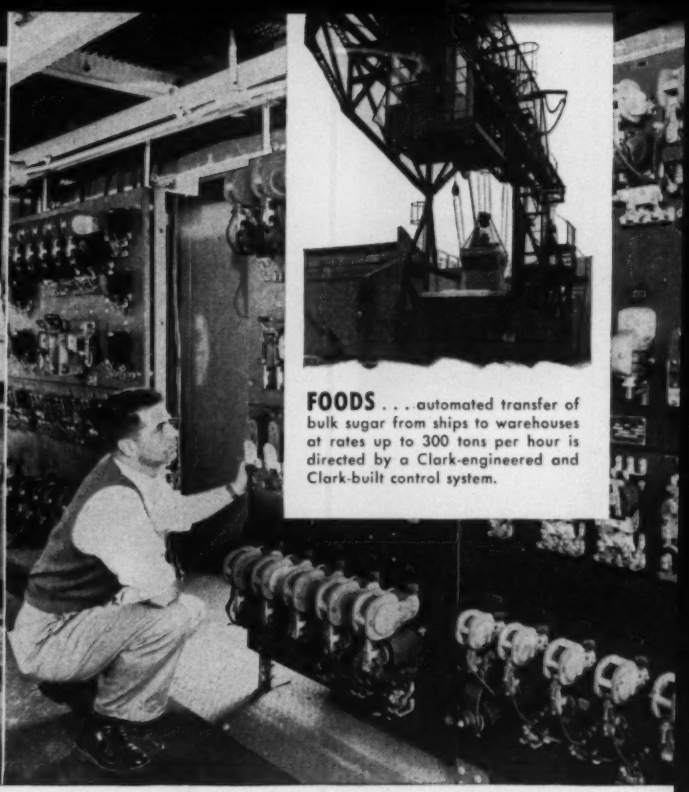
Such an economy, Mr. President-Elect, will be one of our most powerful weapons for preserving the peace.

Walter J. Campbell

EDITOR

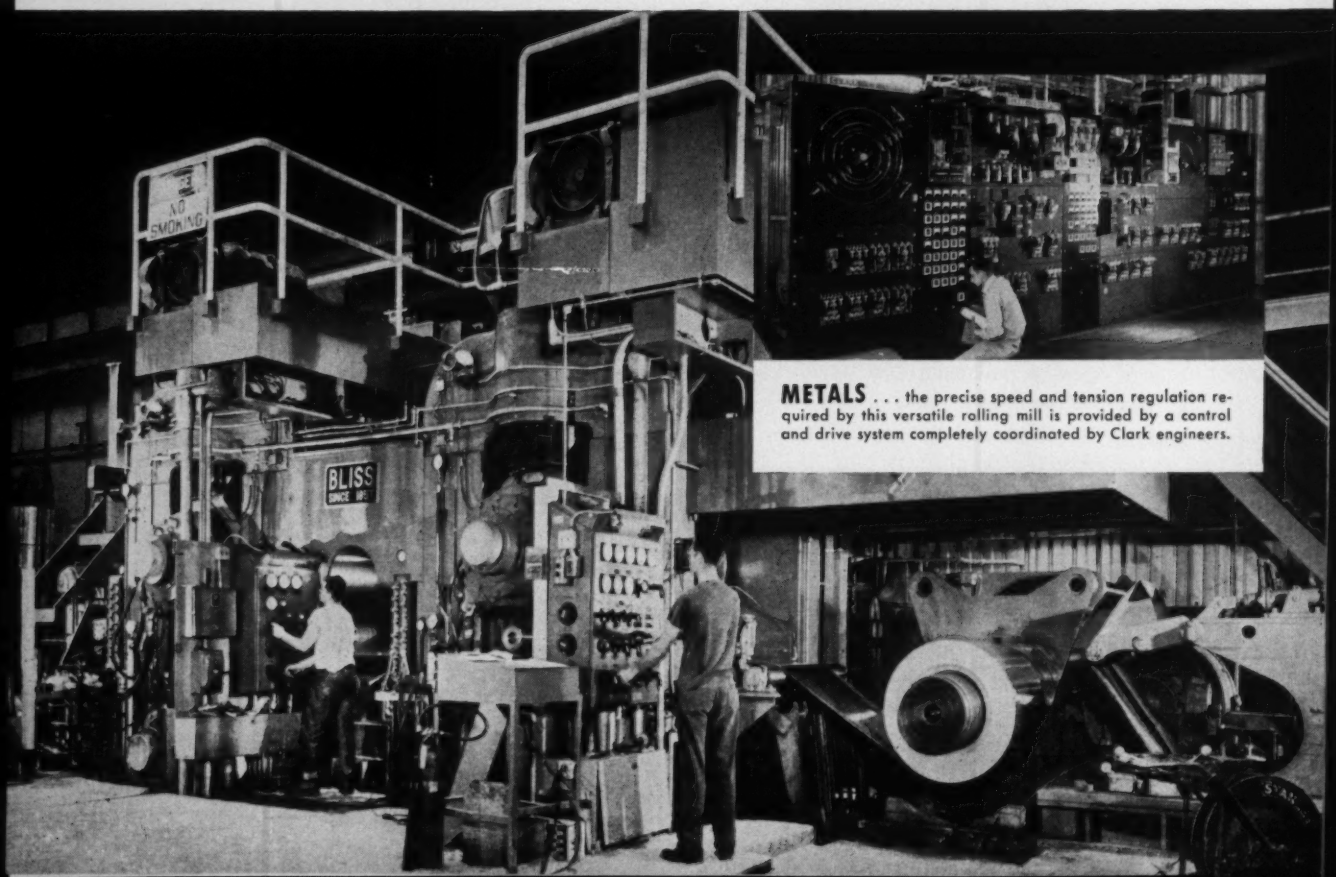


PLASTICS . . . uniform thickness of vinyl plastic sheet being produced on this machine is maintained by using a Clark-engineered "cascaded draft control" drive system for individual motor speed adjustment and for "tracking" the speeds of all following motors in the calendar train.

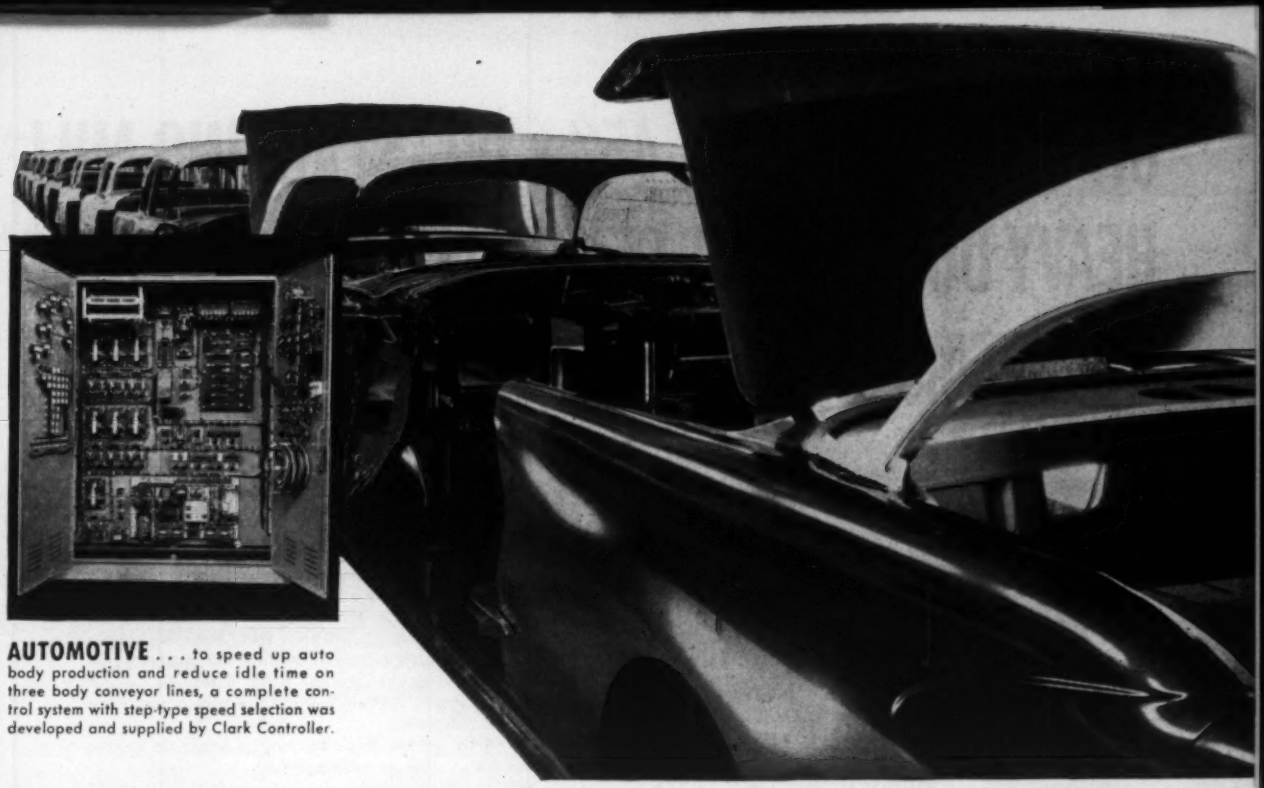


FOODS . . . automated transfer of bulk sugar from ships to warehouses at rates up to 300 tons per hour is directed by a Clark-engineered and Clark-built control system.

How to get the most from



METALS . . . the precise speed and tension regulation required by this versatile rolling mill is provided by a control and drive system completely coordinated by Clark engineers.



AUTOMOTIVE . . . to speed up auto body production and reduce idle time on three body conveyor lines, a complete control system with step-type speed selection was developed and supplied by Clark Controller.

your machines and processes

Automatic control is the most vital element in today's automated processes, systems and machines.

Clark engineers are specialists in automatic controls, and Clark's control equipment—relays, contactors, push buttons, control centers, etc.—is designed with a thorough knowledge of specific industry requirements.

Clark is therefore ideally qualified to furnish complete coordinated control and drive systems.

Perhaps this great combination of product and experience can help you directly. It makes no difference what industry or type of production machinery or process. More and more automation-minded manufacturers everywhere are turning to Clark for completely coordinated control engineering service and equipment.

From concept to start-up, Clark engineers work as partners with engineering and manufacturing personnel, consulting engineers, contractors, and equipment manufacturers. We welcome the opportunity to show you how they can work for your particular advantage. For more information, contact your nearest Clark Controller sales office. Or, write direct.

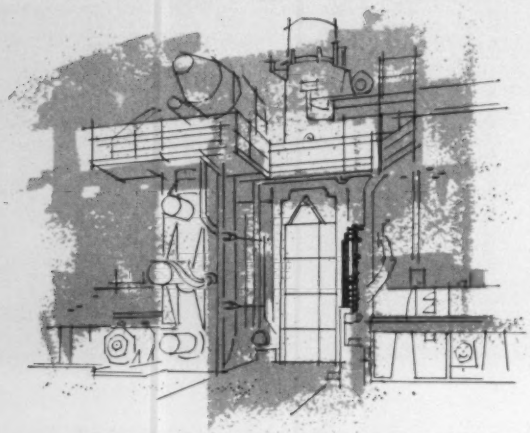
00 A1

The
CLARK CONTROLLER
Company

"Everything Under Control"

Main Plant: *Cleveland 10* • **Western Plant:** *Los Angeles 58*
In Canada: *Canadian Controllers, Limited, Toronto*

ON INLAND STEEL'S 45" x 90" SLABBING MILL HEAVY DUTY FARVAL CENTRALIZED LUBRICATING SYSTEMS EASILY ADAPT TO BULK HANDLING

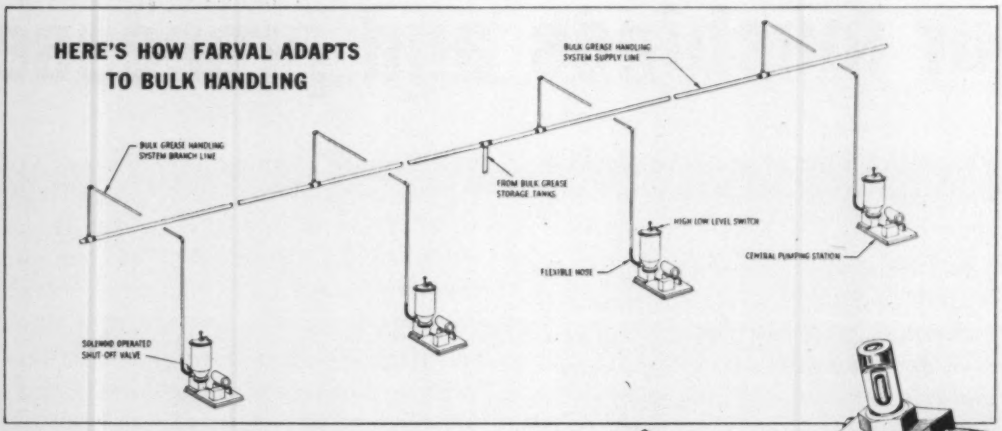


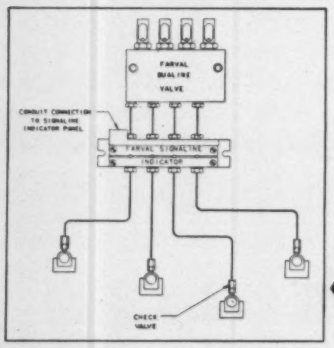
On Inland Steel's high production slabbing mill (shown at left) 1,023 bearings are served by 12 Farval Centralized Lubricating Systems. A single low pressure supply line connects each automatic central station reservoir to the bulk storage tanks—insures a constant supply of lubricant direct to bearings through individually operated Farval Systems.

On typical bulk handling installations (shown below), Farval reservoirs provide a reserve supply of lubricant for each system at all times. Manual or automatic controls can be provided for filling of reservoirs from the main supply line. System flexibility is assured by these Farval-engineered features—rugged double plunger units, automatic system timing controls and individual adjustable measuring valves with visual indicators.

With Farval on the job, indication is based on system performance . . . not on system failure.

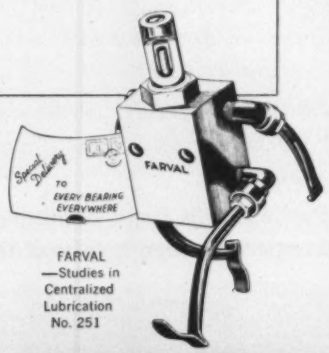
YOU ALWAYS FEEL SAFER WHEN YOU SEE THE FARVAL VALVES OPERATE.


HERE'S HOW FARVAL ADAPTS TO BULK HANDLING
BULK GREASE HANDLING SYSTEM SUPPLY LINE
BULK GREASE HANDLING SYSTEM BRANCH LINE
FROM BULK GREASE STORAGE TANKS
HIGH LOW LEVEL SWITCH
CENTRAL PUMPING STATION
FLEXIBLE HOSE
SOLENOID OPERATED SHUT OFF VALVE



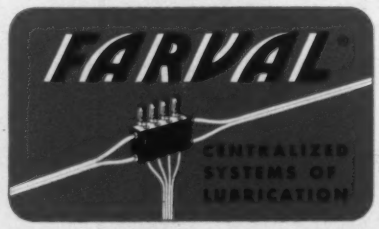
From bulk tanks to bearings—whether on a new installation or existing one—independently operated Farval Centralized Lubricating Systems can be easily tied into a common source of lubricant supply.

From bulk tanks, lubricant moves under low pressure through the main supply line to Farval reservoirs. Thus, use of this method avoids the dangers created in subjecting a large volume of lubricant to constant high pressure.



FARVAL
—Studies in Centralized Lubrication
No. 251

New Signaline Indicator—exclusive only with Farval—guarantees positive remote indication of broken or plugged discharge lines on critical bearings.



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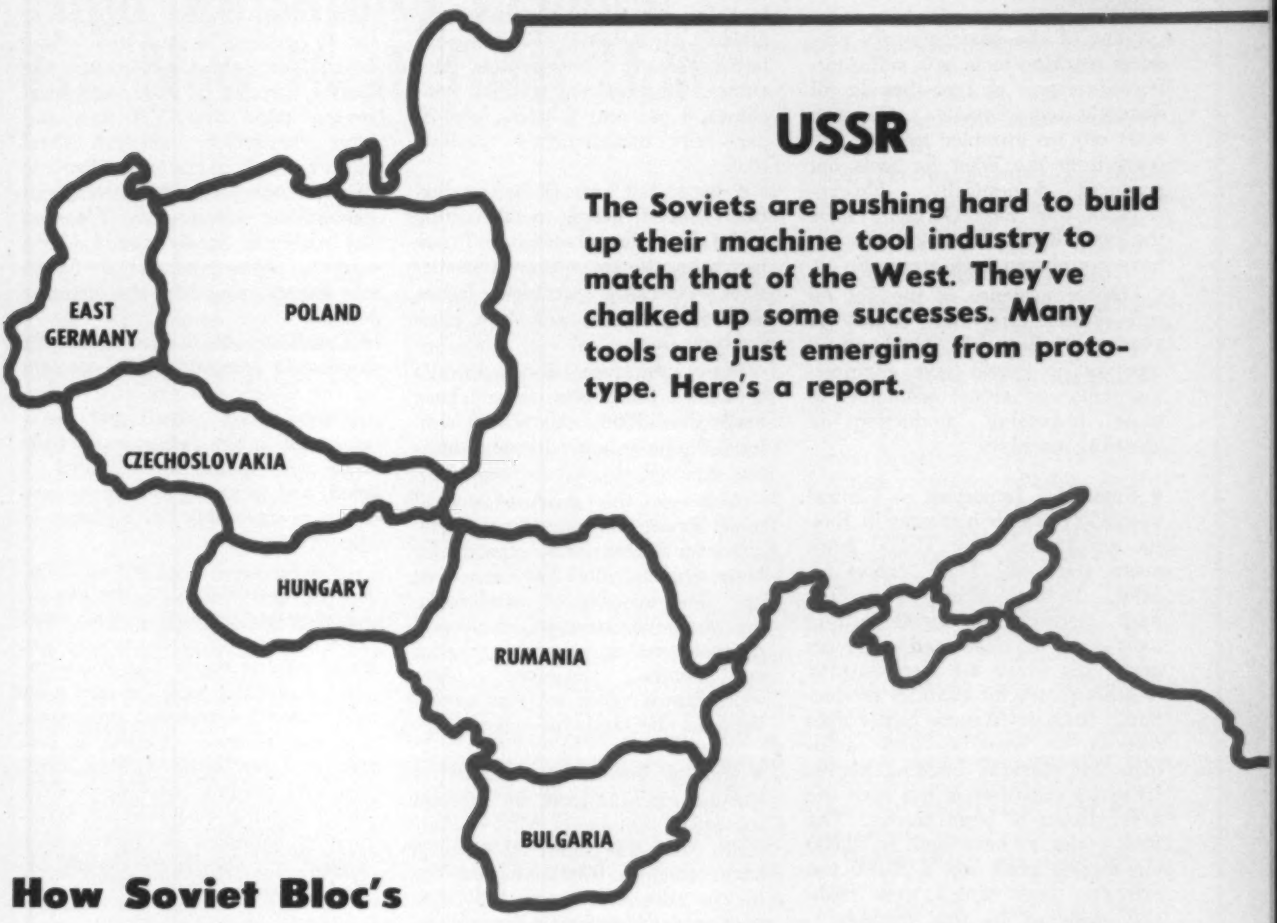
EATON



The Soviets are pushing hard to build up their machine tool industry to match that of the West. They've chalked up some successes. Many tools are just emerging from prototype. Here's a report.

How Soviet Bloc's

Machine Tool Industry Stacks Up

HOW SOON can U. S. equipment builders expect to feel the impact of the Soviet Bloc on the world market?

Within five years, the Soviets expect to be exporting 15 to 20 per cent of their machine tools. Production goals of the latest seven year program (1959-65) call for the annual production of 190,000 to 200,000 metal cutting and 36,-200 metal forming machine tools by 1965.

"Progress made to date indicates they'll achieve a major share of their plans," Forrest D. Hockersmith, director, export policy staff of the Commerce Department, told builders at the National Machine Tool Builders' Association in Hot Springs, Va.

Production will include 38,000 specialized machines and 50 types of numerically controlled machine tools. The number of metal cutting tools manufactured will be boosted by 1500 types, and 500,000 existing machine tools will be modernized. Expected inventory by 1965: 2.5 million. Present inventory: 2 million.

Mr. Hockersmith points out that Soviet Bloc exports to Free Europe rose 100 per cent between 1954 and 1959, while imports by the bloc climbed only 81 per cent. During the same period, total USSR exports jumped 152 per cent, while imports increased but 66 per cent.

• **Why the Growth?**—Four factors are speeding the Red advance, explains Mr. Hockersmith:

- A high degree of standardization.
- Specialization of production in many plants.
- Use of conveyor methods of machining and assembly.
- Extensive research facilities.

• **Key Factor** — To avoid or limit overlap in production of identical machinery, the bloc countries have formed a Council for Economic Mutual Aid, relates Mr. Hockersmith. CEMA decisions, which standardize and dovetail machine tool pro-

duction, are subject to mutual agreement by the countries concerned.

None of the bloc countries produces machine tools in a sufficiently wide range of type-sizes to fill domestic requirements. So each must rely on intrabloc trade or imports from the West for tools not produced domestically. Czechoslovakia and East Germany have the capability to fill their needs but have not chosen such a course.

Positive evidence of the net result of such integration is not yet available. But, Mr. Hockersmith observes, it should save engineering skills and accrue economies to those increasing production of identical machines.

• **Research Important** — Central scientific research institutes in Russia are staffed with 10,000 engineers, states the U. S. export official. An institute in Moscow does basic research on metal cutting tools and develops and produces prototypes which are then assigned to other plants for quantity production. Another Moscow center does research on materials and equipment for machine building plants. Its major contribution has been the development of large presses. The Reds claim to have built a 70,000 ton forging press and a 20,000 ton extrusion press which were probably designed by that institute.

A new concept in large forging presses over 30,000 tons has also been developed by the Moscow scientists. The method employs a large cylinder of prestressed concrete to contain the moving components. Researchers say the design will eliminate the need for large forging presses of all-metal construction in the future.

Another function of the central institute is to set standards for modification of older machine tools for modernization or conversion to automatic cycle units.

• **USSR Output**—In the USSR, 170 plants make machine tools, 50 specialize in metal cutting, and 10 in metal forming equipment. The remaining plants produce other machinery besides machine tools. More than 125,000 workers are engaged in the manufacture of machine tools.

The Russians report metal cutting tool production rose from 70,579 units in 1950 to 138,000 units in 1958. Output this year will be divided as follows: 30 per cent lathes, 25 per cent drilling machines, 10 per cent milling machines, 8 per cent grinders, and 27 per cent miscellaneous machine tools.

Prior to last year, Soviet production stressed heavy metal cutting tools. But current emphasis is on increasing the proportion of smaller sizes, especially precision lathes, drilling machines, and fine pitch hobbers.

Many prototypes of numerically controlled machines have been made since 1958. About 400 electrical discharge and ultrasonic units are expected to be built this year.

Although the product mix of metal forming machines is not adequate for Soviet needs, capacity for large machine tools has been built up. The majority of metal forming equipment consists of general purpose presses, hammers, shears, and bending machines. More sophisticated types are just emerging from the prototype stage.

• **Quality Varies**—The quality of Russian machine tools, by Western standards, comments Mr. Hockersmith, runs the gamut in technical advancement, from obsolete to highly advanced types and from poor to good workmanship. Materials are good, and design is functionally adequate, but almost all models are underpowered when compared with U. S. machines of comparable size.

Production practices generally parallel conventional methods used in the West. A high degree of component standardization is employed. State and departmental standards apply to 85 per cent of the general purpose metal cutting and 75 per cent of the general press and forge machine tools.

The Soviet industry, reports Mr. Hockersmith, appears to use steel weldments more extensively than does the West for metal forming tool production. He says that is probably due to its success in developing the electroslag welding technique for use on thick steel plates and steel castings.

• **East Germany** — This country produces a wider range of metal cutting and metal forming machine tools than any other European satellite. Metal forming units account for 45 per cent of total production. In the bloc, the Germans are the largest producers of mechanical presses rated over 500 tons and large counterblow hammers. Metal cutting toolmakers specialize in grinding machines, jig borers, and gearmaking machinery. Most of the tools are equal to, and a few surpass, those produced in Western Europe, says Mr. Hockersmith.

• **Czechoslovakia** — Metal cutting equipment accounts for 80 per cent of the Czech machine tool industry production. Small and medium sized turret lathes and radial drills are specialties. Quality is good, and technological refinements compare favorably with those in the West.

• **Poland**—It's third in the bloc in machine tool production, with more than 85 per cent of the units being metal cutting types. The Poles emphasize machine tools for steel mills and railroad equipment production and maintenance. Variety is limited to a few lathe, milling, drilling, and planing machine models. Metal forming machines are mainly drop hammers. Workmanship is good, but designs are slightly behind the time.

• **Hungary** — Hungarian machine tools are all metal cutting types, mostly upright and radial drills, engine lathes, and knee type milling machines. The majority are light duty units, lacking advanced technological refinements. Workmanship is fair.

• **Others**—Bulgaria and Rumania produce about 3000 units annually. Bulgarian production is chiefly engine lathes and upright drills. Rumanian output is entirely engine lathes. Most units are obsolete and show poor workmanship, concludes Mr. Hockersmith.

Have you entered STEEL's Usership Idea Contest?
Pages 5 and 6.

High Versatility Claimed For New Heat Treat Unit

AN ADVANCE in induction heating, a single unit that will handle a large number of "medium and heavy duty requirements . . . from the point of a needle to massive gears," is claimed by Induction Heating Corp., Brooklyn, N. Y., and Bennett Heat Treating Co., Newark, N. J.

The two companies say their 50 KW machine offers interchangeable high and low frequency ranges—200 to 450 kilocycles and 5 to 10 megacycles.

• **What It'll Do**—In what the firms term a "first report," the new machine was used to put a thin case on the fine teeth of small and medium sized, high precision gears. The high megacycle frequency range was employed.

Induction Heating and Bennett say: "The hardness pattern followed the contour of the gear teeth from face to root and appeared similar to that produced by conventional, case hardening methods. Only the surface was heated by this frequency, (so) practically no change in gear dimensions occurred.

"Heating cycles were shorter than anticipated, making it necessary to employ a heat timer with 1/100 second sensitivity. In the case of extremely fine tooth gears, the hardening temperature was reached in only one-fifth of a second.

"Uniformity in heating assured uniform hardness; and the split second timing assured uniformity of one part to another. The gears were handled on a production run basis at 7.5 million cycles."

The companies claim that the equipment can harden, braze or anneal high precision parts, as well as standard sized parts like gears, cams, shafts, or other items that might require selective hardening.

• **More Details**—On straight run "standards," most induction hardening jobs can be processed with a frequency of about 300 kilocycles, the companies report. To increase heat penetration, output of the equipment is reduced, and heating time is extended by a few seconds.

In many instances, quenching may not be necessary. In the gear example, only the surface had been heated, and the remaining unheated metal caused the parts to chill so rapidly as to become self-quenching.

But work stations on the machine are equipped for automatic spray or drop quenching in water, oil emulsion, or oil. Temperature of the oil emulsion and oil used is controlled by a heating-and-cooling heat exchanger.

Other features cited:

• Revolving fixture or work platform to gain uniform heat penetration from all sides of the parts.

• A new type, variable ratio, output transformer which is said to permit greater control of narrow band selective heating at high efficiency.

• Automatically controlled transformers to guard against voltage variations.

• A water-air heat exchanger to air condition the unit.

Foundrymen Adopt Exhibitors' Code

IN A FIGHT to control trade show costs, the American Foundrymen's Society has adopted a set of principles to correct or eliminate practices which have pyramided service charges.

Selection of future convention and exposition sites by the society will depend on acceptance of the principles. San Francisco has been chosen for the 65th National Castings Exposition next May on that basis.

The principles call for:

1. The acceptance of full responsibility by all parties concerned to create and maintain a favorable atmosphere of conditions, costs, and fair dealing for industrial conventions and expositions.

2. The establishment and acceptance of primary obligations by those who sponsor and those who service industrial conventions and expositions.

3. The development of a system for daily control and adjustment of all questionable exhibit service charges as they occur, instead of weeks after the event closes.

William W. Maloney, AFS general manager, doesn't place the blame for rising exhibit costs on any one group. "The real trouble," he says, "is too little control by those in a position to exercise control. Sponsoring groups accept and publish without question service charges exactly as quoted without any control over their application. Exclusive service organizations take little or no responsibility for quality of labor they provide and few exercise any control over work standards and performance."

Other abuses cited: Inadequate supervision of exhibit halls, failure of exhibitors to provide advance data on their needs, excessive labor rates, overtime abuses, payola practiced by exhibitors to gain special treatment.

Unless abuses are corrected, exhibitors and organized exhibitor groups likely will act along one of these three lines, predicts Mr. Maloney: "They will have fewer quality operating and dramatic exhibits, or they will demand that expositions be held less frequently, or they will refuse to participate in expositions scheduled for costly and trouble beset localities."

Japanese Loan to Purchase U. S. Tools, Machines O.K.'d

The Export-Import Bank of Washington authorized a $9.3 million credit to Isuzu Motor Co. Ltd. of Japan last week. Funds will be used to purchase U. S. machinery and equipment for a new auto plant near Yokohama.

Officials report it'll generate more than 100 orders for 20 U. S. suppliers of automotive industry tools and machinery.

College Placement Directors Report . . .

- **Recruiters' Prime Sins**—Lack of punctuality, lack of preparation, inadequate training, haphazard follow-ups.

- **Higher Starting Salaries**—Average starting salaries for holders of B.S. degrees in engineering from Michigan are up 2.3 per cent from last year ($524 monthly); master degrees, up 9 per cent ($655); Ph.D. degrees, up 6.5 per cent ($858).

- **Students Most in Demand**—Accounting and financial majors are being wooed more; liberal arts graduates are becoming choice targets; engineering and physical science degrees are holding their own.

As competition gets keener, colleges suggest . . .

Five Tips for Better Recruiting

SMALL AND MEDIUM sized firms take heed: College students are showing greater interest in employment with your companies.

You're missing a good bet if you don't stress the comparative advantages of working for a small vs. a large organization:

- Jobs often have a wider variety of duties.
- There are more opportunities for self-expression.
- Advancement is often faster.

That's the advice of Dr. George Odiorne, director of the industrial relations bureau for the University of Michigan's Business Administration School. "We find our students are selling themselves on those points instead of having companies do it for them," he point out.

Most big companies are well versed in the recruiting game. But Dr. Odiorne and other college placement directors believe that too many small and medium sized firms still seem reluctant to enter the arena. One suggestion to firms that don't recruit on their own: Band together through industry associations to woo top graduates.

Competition on the campus for the better students is as keen as ever, report the colleges. Whether you're a freshman or an old hand at recruiting, here are some guideposts which placement directors suggest to help you get the most for your recruiting dollar.

Preparation Pays Off

Carefully select the schools. Nationally recognized academic ratings and geographical location are two top measuring sticks. You may also have other criteria based on job needs and company attitudes.

Make sure company literature reaches placement offices well ahead of your recruiters. Students will have a better chance to become acquainted with your firm. Warns Dr. Odiorne: "Make your recruiting brochures realistic, convincing, and cordial. Students want facts, not fluff. Let them know they will be expected to work too."

Select Recruiters Carefully

Your recruiter is usually your company's image on the campus. Students pass along their impressions of your recruiters (therefore your company) to their fraternity brothers and dormitory mates. Whether you use full-time recruiters or press supervisory personnel into service, have well defined specifications to select them.

The use of a team to interview each student is generally not recommended. Too often it develops into an interrogation session. Pressure recruiting and cute or trick questions are also frowned on. Dr. Odiorne

admits the pressure technique occasionally pays off if you are looking for a man who can quickly step into a job where his people contacts must be abrasive.

Know What You're After

Make sure top management and recruiters agree on the manpower you are seeking.

Grades are the first criterion in evaluating students. Tell placement officers you want to talk with only the top third of the class.

Use a formal evaluation chart. Ford Motor Co. rates students from excellent to poor on a variety of subjects, including attitude, appearance, expression, leadership, maturity, resourcefulness, and sociability. Small companies should probably pay more attention to personality traits than larger ones because their working relationships are closer.

Follow Up Interviews

Recruiters should summarize their evaluation of a student immediately after the interview. In later screening prior to formal job talks or plant visits, you inevitably have to rely heavily on his impressions.

Let the student know your decisions as soon as possible—other companies are after him too.

After the graduate has accepted a job with your firm, make sure he knows where, when, and to whom he is to report. Have someone on deck to meet him.

Start Hunting Early

Although most firms must concentrate on recruiting seniors, more companies are starting to look for the "comers" early in their college careers.

Summer employment for undergraduates is one method.

One automaker hires student teams in the summer to do research projects that are often neglected in the rush of regular business.

Reminds James M. Osborne, manager of Ford's college recruiting program: "Know your colleges. Know your placement officers. Cultivate campus contacts. Keep selling your management on the benefits of regular recruiting to fill long term needs."

Here's How Ford Looks at Recruiting

Unlike many corporations, Ford Motor Co. does not use full time recruiters. Instead, its four man College Recruiting Dept. co-ordinates the activities of about 70 company supervisors, each of whom spends two to four days a year on recruiting calls. All of them hold full time management jobs, mostly in personnel or administrative work. Each is specially qualified before being accepted for recruiting duty. They spend two or three days twice a year in refresher sessions to bring them up to date on needs and practices.

Explains James M. Osborne, manager of the department: "We feel that additional specific training is unnecessary. To qualify, our recruiters must be supervisors. That automatically means they have achieved a measure of prestige and management success. In addition, they must have persuasive abilities, demonstrate an understanding of the entire corporation structure, and be able to sustain their 'cordiality level' throughout a full day of interviewing. They must be able to make a quick evaluation of a student's management potential to determine whether Ford wants to process him further."

Ford recruiters go to about 100 schools each year. They interview for all job openings on a company-wide basis. The company is trending slightly toward more interviews at smaller liberal arts colleges where training is broader. Says Mr. Osborne: "We're not unsophisticated about the need for engineers and scientists, but we're looking for people who have the ability to transfer their skills to other jobs regardless of what their formal training has been. We seek a core of people who will be management candidates 15 or 20 years down the line."

Hiring of college graduates has leveled off at about 500 year, reports Mr. Osborne. He says 20 per cent of the 1961 crop will be hired for financial jobs. Another 20 per cent will be aimed at sales administration (dealer field contacts). About 35 per cent go into manufacturing and engineering operations. The rest will be hired for jobs in purchasing, industrial relations, standards, and various other tasks. Over half the students who submit applications are invited to the company for further screening. About one fifth are hired.

Thermoelectric Projection: $3 Billion Market by 1970

"THERMOELECTRIC refrigeration, heating, and power generation will become a substantial industry by 1965 with annual sales totaling over $400 million. By 1970, annual sales will probably reach $3 billion. Thermoelectrics will have a good part of the industrial and military markets and will radically change the consumer electric refrigerator-appliance field."

That's what Dr. Robert A. Bernoff, director of research, Materials Electronic Products Corp., Trenton, N. J., told the University of Pittsburgh's conference on business prospects.

Thermoelectricity is the conversion of heat into electricity—or of electricity into heat or cooling—without moving parts.

• **Present Uses**—Dr. Bernoff says thermoelectric cooling is practical now for small system consumer applications, such as portable refrigerators, dehumidifiers, water coolers, bottle coolers and warmers, and refrigerated serving tables.

Current industrial applications include outdoor fluorescent fixture cooling, electronic component cooling, lab equipment cooling, and medical specialty cooling.

He says retail sales of thermoelectric cooling and heating products should total about $1 million in 1961.

• **Coming Uses**—Typical household applications in 1965 will include thermoelectric kitchens with distributed cooling in refrigerated drawers, table top chilling, and warming of dishes.

Dr. Bernoff looks for these industrial applications by 1965: Aircraft and truck cooling, heated and cooled clothing, cooling for industrial motors and other equipment hot spots, plus refrigeration for vending machines.

Military expenditures for thermoelectrics may reach $100 million annually by 1965, Dr. Bernoff predicts.

• **Who'll Be Affected**—What industries will be most affected by increased use of thermoelectric cooling? Dr. Bernoff answers: "By 1970, it will seriously affect manufacturers of compressors, condensers, evaporators, refrigeration gases, motors, copper tubing, and other parts of conventional refrigeration systems." Apparently, one of the major manufacturers of motor compressors agrees. The firm has recently acquired a semiconductor firm which was one of the pioneers in thermoelectric research.

But Dr. Bernoff adds: "No manufacturer other than those now making motor compressor components should expect a decline in business due to increased use of thermoelectric cooling. The biggest effect will be on the appliance industry where thermoelectrics will be introduced as new products rather than replacement items. Eventually, thermoelectric cooling may well double the household appliance market."

• **And Aided**—New markets will be opened to raw material suppliers of elements used in the manufacture and assembly of thermoelectric devices. By 1975, the electronic industry will probably gross a few million dollars annually via the fabrication and attachment of thermoelectric devices, Dr. Bernoff predicts.

• **Power Generation** — More than 800 companies are doing research and development work on thermoelectric power generation, Dr. Bernoff reports. He says that more than $10 million has been spent in the last year for R&D and retail sales.

Thermoelectric power generation is being used for consumer devices such as the Baso valve for control in gas fired hot water systems and the Russian kerosine lamp which generates enough electricity to run a radio receiver or transmitter. Thermoelectric power generating units are now commercially available in this country and are being used as portable power supplies for such applications as cathodic protection for gas pipelines and powering signal buoys or other isolated beacons.

Present military applications include Martin Co.'s Snap device which converts heat from nuclear sources to electrical power. Such devices have long lives and are reliable power supplies for space applications, says Dr. Bernoff. The Navy has contracted for thermoelectric power units in the 100 to 5000 watt range. The units operate from gasoline, kerosine, and propane fuels.

• **Efficiency Timetable**—The efficiency of the thermoelectric power generator is proportional to its figure of merit (a measurement of materials' efficiency) and the temperature range over which it can operate. The best materials available today can operate at temperatures up to 1400° F. They have a figure of merit of 1.5 to 2 with efficiencies up to 10 per cent.

"By 1965, efficiencies of 20 per cent over temperatures up to 1600° F should be available," Dr. Bernoff asserts. He believes that, by 1970, technical advances should bring a thermoelectric power generator operating at 30 per cent efficiency up to a temperature of 2000° F. That would permit thermoelectrics to compete in the 10,000 kilowatt range.

Labor Strife Falls To Postwar Low

Only 225 labor stoppages (involving 140,000 workers) started in September, a postwar low for the month, reports the Department of Labor. During the month, idleness resulting from stoppages amounted to about 1.8 million mandays, only 0.19 per cent of the estimated working time.

"Fewer strikes began during the first nine months of 1960 and fewer workers were involved than in any similar period since the end of World War II," said Labor Secretary James P. Mitchell. Strike total: 2765. Number of workers involved: 1,120,000.

Foreign Sales Add Lift to Earnings

PROFITS from trade and operations abroad gave a lift to third quarter earnings of U. S. companies.

W. F. Rockwell, chairman, Rockwell-Standard Corp., Coraopolis, Pa., reports: "Sales of our products by foreign companies in which we have partial ownership have exceeded our expectations, reflecting the great prosperity which many foreign countries are enjoying, in contrast to the cost-price squeeze situation so generally felt at home."

Other examples: Raytheon Co., Waltham, Mass., earned $5 million from European interests, overseas operations represented 49 per cent of the third quarter volume for the Caterpillar Tractor Co., East Peoria, Ill., and will account for about 40 per cent of the volume for National Cash Register Co., Dayton, Ohio.

On the home front, price cutting is generally blamed for slimming profits. Though sales of some companies have surpassed or equaled last year's pace, profits have been below expectations. Poor sales posted during the third quarter (traditionally slow) are further depressing earnings.

Improved earnings by the steel industry are misleading. The industry was strikebound last year. Business declined during the third quarter, affecting profits correspondingly.

Improved sales expected during the fourth quarter brighten profits prospects for the period.

Cost-Price Squeeze Hits Earnings

(Third quarter, net profit)

SELECTED COMPANIES	1960	1959
Air Reduction Co. Inc.	$3,747,063	$3,627,580
Allis-Chalmers Mfg. Co.	1,251,383	10,140,189
American Brake Shoe Co.	461,022	917,069
American Can Co.	12,973,789	18,653,458
American Machine & Foundry Co.	5,446,000	4,288,000
American Steel Foundries	7,793,363	7,168,027
Babcock & Wilcox Co.	4,058,000	2,568,000
Bell & Howell Co.	1,626,000	1,567,000
Bliss (E. W.) Co.	377,083	(158,653)†
Bliss & Laughlin Inc.	1,610,565*	1,875,000*
Budd Co.	(971,000)†	256,000
Buffalo Forge Co.	363,899	319,297
Burroughs Corp.	1,154,000	2,104,000
Caterpillar Tractor Co.	12,379,070	14,435,633
Chance Vought Aircraft Inc.	1,191,944	1,20?,651
Clark Equipment Co.	1,471,146	3,650,747
Cleveland-Cliffs Iron Co.	3,719,790	1,292,891
Clevite Corp.	1,180,000	1,414,000
Continental Can Co. Inc.	10,557,000	17,442,000
Cooper-Bessemer Corp.	1,159,000	1,345,000
Crane Co.	2,062,000	1,964,000
Cutler-Hammer Inc.	4,162,124*	5,2?4,349*
Eaton Mfg. Co.	1,131,646	3,615,259
Electric Autolite Co.	231,936	481,485
Electrolux Corp.	767,134	684,114
Ferro Corp.	435,000	809,000
Freeport Sulphur Co.	3,089,260	4,017,833
General Electric Co.	57,506,000	72,273,000
General Instrument Corp.	570,445	402,500
General Motors Corp.	89,143,941	134,398,199
General Steel Castings Corp.	533,497	140,080
Hanna (M. A.) Co.	3,843,608	3,204,686
Harbison-Walker Refractories Co.	2,418,106	1,156,977
Johns-Manville Corp.	7,582,000	8,431,000
Kawneer Co.	556,000	636,000
Link-Belt Co.	4,078,703	4,559,727
Magnavox Co.	1,690,000	1,240,000
Maytag Co.	2,337,070	3,448,092
Minneapolis-Honeywell Regulator Co.	6,374,560	8,494,961
National Acme Co.	1,165,031*	1,248,404*
National Cash Register Co.	12,179,673	12,563,762
National Malleable & Steel Castings Co.	(357,149)†	109,179
Northrop Corp.	7,740,219	7,325,404
Parker-Hannifin Corp.	393,520	768,889
Porter (H. K.) Company Inc.	490,161	1,150,476
Radio Corp. of America	6,000,000	7,900,000
Raytheon Co.	1,952,000	2,562,000
	5,040,000**	
Rockwell-Standard Corp.	1,127,412	4,050,907
Simonds Saw & Steel Co.	2,571,762*	4,053,645*
Square D Co.	3,226,598	2,974,863
Stewart-Warner Corp.	1,320,425	2,036,003
Studebaker-Packard Corp.	(3,254,799)	3,399,797
Thompson Ramo Wooldridge Inc.	1,824,284	1,784,790
Union Carbide Corp.	36,234,763	36,556,722
Westinghouse Electric Corp.	20,226,000	22,075,000
Yale & Towne Mfg. Co.	3,998,960*	3,189,894*

†Loss.
*Nine month results.
**Earned abroad.

Steelmaker Profits Improve

(Third quarter, net profit)

SELECTED COMPANIES	1960	1959
Alan Wood Steel Co.	($82,018)	$985,440
Allegheny Ludlum Steel Co.	647,902	913,320
Bethlehem Steel Corp.	12,436,106	(38,926,913)†
Carpenter Steel Co.	687,835	1,573,368
Colorado Fuel & Iron Corp.	(3,200,729)†	6,361,283
Continental Steel Corp.	812,958	1,057,379
Copperweld Steel Co.	(40,443)†	684,775
Crucible Steel Co. of America	1,825,711	2,034,090
Detroit Steel Corp.	100,533	2,844,530
Granite City Steel Co.	1,789,858	3,260,008
Inland Steel Co.	5,135,369	(7,449,109)†
Jones & Laughlin Steel Corp.	3,483,000	(16,465,000)†
Kaiser Steel Corp.	(5,802,364)†	(10,894,581)†
Lone Star Steel Co.	3,912,602*	10,022,477*
Lukens Steel Co.	49,000	26,000
McLouth Steel Corp.	3,445,658	(3,193,566)†
National Steel Corp.	8,061,074	2,821,600
Phoenix Steel Corp.	(568,000)†	489,000
Republic Steel Corp.	7,310,271	(24,861,406)†
Sharon Steel Corp.	(840,342)†	(1,560,080)†
U. S. Steel Corp.	52,415,599	(31,135,136)†
Universal-Cyclops Steel Corp.	537,428	361,553
Vanadium-Alloys Steel Co.	203,163	522,876
Washington Steel Corp.	351,035	759,205
Wheeling Steel Corp.	558,000	(4,263,000)†
Youngstown Sheet & Tube Co.	2,676,626	(7,149,670)†

†Loss.
*Nine month results.

Business Looks at Kennedy Election: No Quick Tax Action; More Spending; Tougher FTC, Antitrust Programs

President-Elect John F. Kennedy

AN ECONOMIST on Capitol Hill sums up Senator Kennedy's election this way: "Jack Kennedy is hard headed, practical, and conservative." The impact on industry, he feels, will be mostly psychological—and favorable at that; if Richard Nixon had been elected, business would have waited to see "what will happen."

With Senator Kennedy elected, business expects more federal spending, easier credit, and increased aid to small business.

Whether or not Senator Kennedy does all the things he promised during the campaign, the economist thinks he will present the appearance of being aggressive. Another source believes the "current recession," which might not have bottomed out before the third quarter, "will bottom out in the first quarter of 1961."

● **HOW MUCH REAL DIFFERENCE?**—Several Washington observers polled by STEEL began their replies with the statement that there really never was much difference between the economic philosophies of Nixon and Kennedy. "At least in the first year," says a defense industry spokesman, "not much real change will occur." Relatively small increases in defense spending can be expected, but their effect on business will depend upon where the money is spent.

● **JUSTICE, FTC, SBA ACTION?**—"The odds are Senator Kennedy will bolster programs at the Justice Department and the Federal Trade Commission. Persons in both parties think competition must be stimulated," says one government source.

Small business appears certain to be in for "dramatic" treatment. A Congressional source close to small business problems suggests new leadership in the Small Business Administration is badly needed. "There is nothing wrong with the 1958 act which made the SBA a permanent agency. Congress has firmly indicated its intent to help small firms."

One protagonist says big firms do not really fight most SBA policies: "It's just that SBA policies are so mismanaged." Help for small firms will most likely come in government procurement, particularly subcontracting and easier credit.

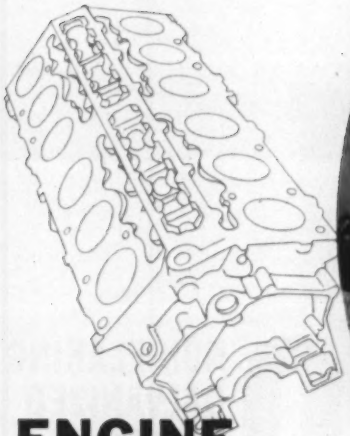
● **TAX ACTION NOT IMMINENT**—All sources contacted (on Capitol Hill, trade association executives, government bureaus, and unionists) agree that tax action is still pretty far off. Senator Kennedy's firmest proposals are in the social security field. If he comes through to Congress immediately with plans for broadening coverage, allowing retired workers to earn more and tying medical care to social security, the House Ways & Means Committee (where tax legislation begins) will be busy for months. Action on depletion allowances will await a special study group's results; action on depreciation will await the Treasury Department's report on its survey of depreciation practices.

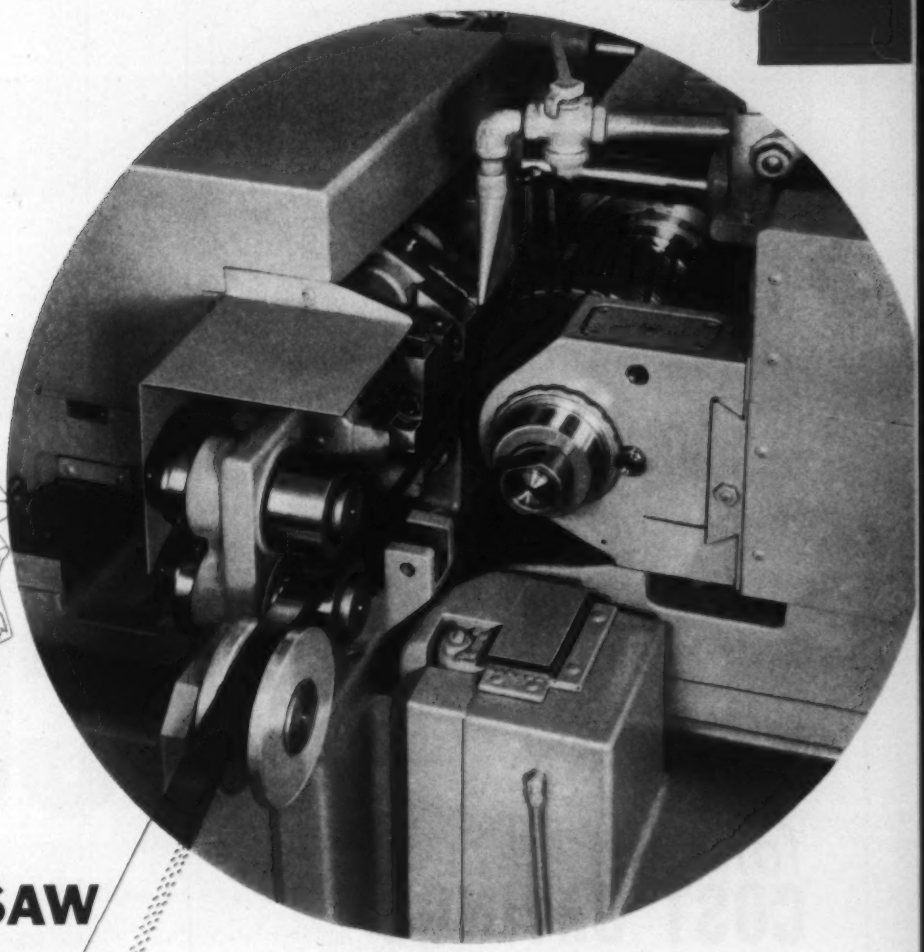
It is probable that Ways & Means will take no action on any tax recommendations of President Eisenhower's last budget until Senator Kennedy's administration has had ample time to form its policies. That might take until the middle of the year.

● **SUMMING UP**—Only a handful of people in Washington expect the new President to duplicate the "100 days" of changes FDR brought about when he took over in 1933. Most expect Senator Kennedy's conservatism to show forth pretty promptly after his inauguration, with the exception of special areas like social security where he has made detailed proposals.

A crest-fallen Republican rationalized this way: "His election will have no major impact on industry. There may be a little inflationary speculation in Wall Street because increased spending is expected, but by and large Kennedy's promises of the moon will not be fulfilled. A slight tendency to pull in our horns after the election will be reversed by our basic confidence in the future of the country."

CINCINNATI





ENGINE BLOCKS

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Whatever the product, industry today shares a common problem . . . how to increase productivity and decrease costs. And the solution frequently is found in Cincinnati Milling's Special Machine Division, who design and build special machines and complete production lines for any industry.

Milling the teeth in ordinary band saw blades affords an interesting example of the Special Machine Division's dependable productivity. Their engineering specialists devised an automatic milling machine with a unique shuttling arrangement. In a completely automatic operation the stacked blades are advanced from reels by the shuttling action of the dual clamping fixture; saw teeth are milled with a 4″ wide cutter, and a continuous box milling cycle permits uninterrupted clamping of the blades. The work advances for the next phase as the box milling cycle is completed. The driving gear on the full size 50 Series machine spindle is larger than the cutter itself, delivering the maximum capacity built into the machine.

What's *your* machining problem? Whether it's a simple twist drill, a band saw blade, or a complex engine block requiring a completely engineered production line, the Special Machine Division is ready to serve you. **Special Machine Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.**

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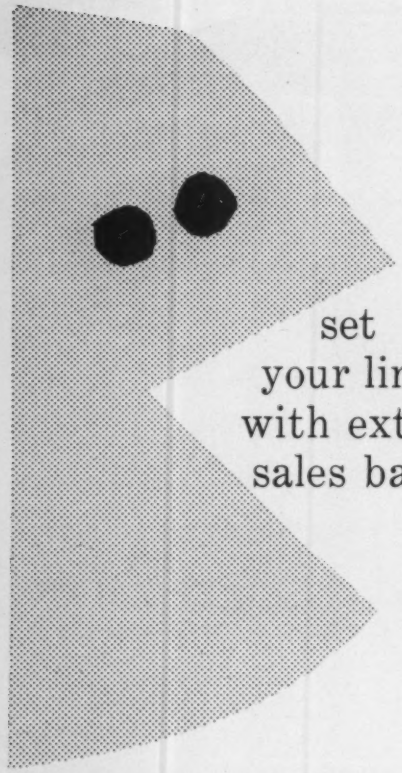

set your line with extra sales bait

• specify • specify

TI-CO® NON-FLAKING GALVANIZED SHEETS

for COST SAVINGS

With today's squeeze between manufacturing cost and a selling price that moves products with satisfactory profit, every production saving deserves careful consideration. That's why many manufacturers are using Inland TI-CO galvanized sheets to more economically provide corrosion resistance for their product. ■ Many times TI-CO can be substituted for more expensive materials. TI-CO can eliminate the need for protective painting . . . often is less expensive. Or, if in your processing you normally form and then pot-dip production parts, this costly step can be eliminated by simply forming the part with the galvanized sheet that takes the toughest fabricating, yet won't chip, peel, crack or flake . . . TI-CO. You'll add extra "sales bait" at the purchaser's level too!

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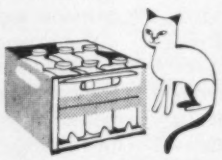
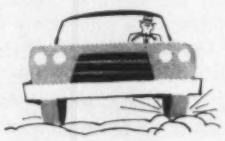
INLAND

Garage door maker saved costs of pot-dipping zinc coated steel rails and hardware when he switched to non-flaking TI-CO.



Manufacturer of milk cases obtained corrosion resistance and increased strength at reduced cost when he substituted non-flaking TI-CO for more costly metal.



TI-CO eliminated painting of hot rolled steel and provided added corrosion resistance for auto wheel suspension component.

NOISE

It "steals" profits by lowering worker efficiency and morale, causes errors and accidents, hampers communications

NOISE costs industry about $2 million daily, estimates Sam L. Hooper, a founder of the National Noise Abatement Council.

You can get a good idea of the scope of the problem from this case history cited by Mr. Hooper: By reducing the noise level in an office 14.5 per cent, a company . . .

- Increased its employee efficiency 8.3 per cent.
- Reduced typist errors 29 per cent.
- Reduced machine operator errors 52 per cent.
- Reduced employee turnover 47 per cent.
- Reduced absenteeism 37.5 per cent.

Many other companies are attacking the problem with equally good results.

"Five years ago, industry accounted for 5 per cent of our sound control business," says Richard D. Lemmerman, manager, Sound Control Dept., Metal Products Div., Koppers Co. Inc., Baltimore. "Today, 30 to 40 per cent of our sales are for industrial applications. In the last six or eight months, there has been a strong upsurge in the demand for industrial silencing equipment." (Example: A $50,000 order for a silencer for a large battery of high pressure fans.)

There has been "tremendous growth" in the use of noise abatement products by industry, reports Armand Lerner, assistant manager, Industrial Dept., Industrial Acoustics Co. Inc., New York. "About half of our business is with industry," says Mr. Lerner, "and it has grown steadily each year." About 95 per cent of the material the company uses is sheet steel. It produces audiometric testing rooms for steel and metalworking companies, as well as air conditioning silencers, enclosures, mufflers, and soundproof doors.

• **Catching a Thief**—To detect and contain noise or unwanted sounds, you have to know what noise is and what it does to your operations. It has two characteristics: Frequency (tone or pitch), expressed in cycles, and intensity (volume or loudness), measured in decibels.

Noise steals profits several ways:

- It hampers production by lowering efficiency and morale.
- It causes errors, induces accidents.
- It interferes with communication: Workers can't hear warnings clearly, can't detect sounds emitted by a defective machine.
- It increases compensation claims and contributes to absenteeism.

• **Three Pronged Attack** — Metalworkers can fight noise by reducing it in one or a combination of three ways:

1. Reduce the noise level at the source through machinery modification.
2. Isolate the source by enclosing it.
3. Absorb the reflected sound

waves by using acoustically absorbent materials.

Arthur D. Park, a research and development engineer for Armstrong Cork Co., Lancaster, Pa., suggests:

"Probably the first step is to look over the equipment in the factory and pick out the chief offenders. (A sound level meter, for measuring decibels, and an octave band analyzer, for sound frequency checks, can be used.) As machines become worn and obsolete, they should be replaced by quieter machines.

"Machines should be properly lubricated; guards and other auxiliary parts should be fastened tightly to the machine proper—and possibly dampened. Iron wheels on trucks should be replaced with rubber tired wheels; metal containers or chutes should be lined with rubber or similar vibration dampening material.

"A second step is to isolate the vibrations of a particularly noisy machine. A vibrating machine, resting directly on the floor or against a wall, sets these surfaces into forced vibration, so that the sound of the machine is greatly magnified. This condition can frequently be corrected by setting the machine on a suitable vibration isolator such as cork, rubber, felt, springs, or coils." (Lead is also widely used in anti-vibration applications. See STEEL, July 25, pp. 149, 150.)

"Important as these measures are," Mr. Park continues, "their contribution may fall short of the desired result if nothing has been done to lessen the duration of the generated noise. Duration of sound in an enclosure is generally referred to as reverberation."

Acoustical treatment of walls and ceiling will cut sound reflection considerably, authorities say. Without acoustical baffling of some kind, up to 95 per cent of the noise reflected from a machine will hit the machine operator.

After baffling, the reflected noise may be cut to as little as 5 per cent. Reflected noise is often enough to send decibel ratings above the safe level of 90.

• **Simple Measure**—Mr. Park points out that if machines are spaced about 5 to 6 ft apart, good results may be expected. "Wide spacing of machines in an acoustically treated area gives the absorbing material an opportunity to do its part before the reflection can build up to annoy nearby workmen."

Dr. Leroy J. Buttolph, executive secretary of the National Noise Abatement Council in New York, says that many noise problems have increased in industry because of "attempts to grow without expanding plant facilities—there has been a tendency to speed up automatic machines and to crowd machines into limited floor space."

He's concerned about lack of planning for location of noisy plants. "There is a serious lack of control over placement of noisy industry in suburban areas. Homes are built adjacent to these companies; this is analogous to our airport problems."

• **Sound of Air**—The high, shrill whine of air powered machinery is often a problem. Much of the noise from plant and equipment can be eliminated inexpensively through the use of mufflers, point out officials of Allied Witan Co., Cleveland manufacturer of mufflers, air filters, and silencers.

Thor Power Tool Co., Aurora, Ill., manufacturer of portable air and electric power tools, designs noise reduction into its products. The company reports that it has softened the sound of its air powered screw drivers and nut setters to "a pleasant hum." It has also reduced the noise made by tools

Six Ways to Control Noise

1. Control it at the source. Good engineering design can eliminate much noise. The din from worn or improperly maintained machines can be reduced by keeping them in good operating condition. Wire mesh screens instead of sheet metal panels reduce vibrating, noisy surfaces. Linings of absorbent materials reduce impact noise.

2. Substitution of a less noisy process. For example, spot, arc, or flame welding for riveting; belt drives instead of gears.

3. Isolation. Move noisy machines to less populated areas of the plant. Install well insulated partitions, and close doors tightly.

4. Enclose or baffle the source. The techniques prevent dissipation of the noise in the surrounding air.

5. Resilient machine mounting. Concrete or wood floors are frequently transformed into huge sounding boards when heavy machines are firmly bolted to them. They amplify the noise and spread it throughout the building. Resilient mountings (rubber or other materials) isolate the machine from floor and reduce the vibration and noise.

6. Sound absorptive materials. Hard surfaces, such as plaster and brick walls, reflect sound and cause reverberation. High frequency sounds can be absorbed by applying sound absorbents to ceilings and walls in the form of acoustical tiles, plasters, sprayed-on compositions, and blankets of porous material such as glass wool. Acoustical baffles can be hung from the ceilings.

Typical Noises

SOUNDS	DECIBELS
Jet motor at 75 ft	130 to threshold of pain
Drop hammer, chipping hammer	110 to 125
Planer, router, special hammer, circular saw	110 to 115
Screw machine, punch press, riveter, cutoff saw, air drill, milling machine, compressed air	90 to 110
Spinner, loom, lathe, loud street noise, police whistle, subway car	80 to 95
Noisy office, average street noise, average radio	60 to 80
Average office, noisy home, average conversation	40 to 60
Quiet home, whisper at 5 ft	20 to 40
Rustle of leaves	0 to threshold of hearing

for grinding, wire brushing, sanding, air hoists, and paving breakers. Built-in mufflers, insulated motor housing with double wall construction and composition interlayer, nondeteriorating muffling packings are used by Thor.

Remote control rooms, observation booths, or quiet rooms are widely used where other noise abatement attempts are ineffective.

Researchers have found that in some cases personal protection is best—earplugs, ear valves, or ear muffs. Rotation of personnel in noisy areas is another method.

• **Some Sounds Desirable**—Sound can also be an asset. When reverberation is reduced in an engine-room, for example, operators can more easily detect any unusual noise which may indicate development of engine trouble.

The low hum of air conditioning units in offices serves to mask out undesirable, intermittent noises.

• **Public Relations**—Noise is also a public relations problem. For over two years, McLouth Steel Corp., Detroit, has been taking steps to reduce noise at its sintering plants in Trenton, Mich., in co-operating

$2925 Investment Solves Noise Problems for 150 Workers

Oneida Ltd., Sherrill, N. Y., manufacturer of tableware and hollow ware, has had an extensive noise control program since 1951, but made a real "breakthrough" in noise protection this year. Workers in Oneida's buffing, polishing, and stamping machine departments have been equipped with sound attenuating ear muffs. (Called Sound Barriers, they are made by Willson Products Div., Ray-O-Vac Co.)

For seven years, the company had experimented with other noise control devices—shielding, testing, personal protection, sound absorption booths—but found the ear muffs to be the most economical and best. Cost: $19.50 per set compared with $600 to $800 for booths, says Howard Buss, Oneida's safety director.

The firm equipped 150 employees working 8 hour shifts in "harmful noise areas" with the ear muffs. Result: Worker fatigue was reduced appreciably and both quantity and quality of production improved.

The noise level created by forging hammers in Oneida's plant registers 110 decibels; stock cutoff operations, 110; a hand fed, 600 to 1200 lb paper shredder, 106; and an automatic buffing machine, 98 to 103.

"On May 31, it became compulsory for certain workers to use the ear muffs," says Mr. Buss. "We did a selling job with our employees on their use first, so we had no trouble."

The company also has a comprehensive program of periodic hearing tests, administered by its medical department.

Noise Control Cuts Costs, Boosts Productivity

W. C. WEEKS, sales manager, Willson Products Div., Ray-O-Vac Co., Madison, Wis., manufacturers of ear muff noise attenuators, told STEEL:

"Industry was slow to accept hearing protection, but today it is paying attention to noise for several reasons." He cites:

- **Noise can permanently damage hearing.**
- **It causes fatigue and low worker morale.**
- **It makes it difficult to hear instructions and safety signals.**
- **It cuts production volume, causes waste and production errors.**
- **In an increasing number of states, loss of hearing because of noise is compensable.**

"The one reason some plant managers are not now concerned about noise," he says, "is because legislation in their area does not cover hearing loss. Yet compensation is one of the minor unpleasant elements connected with noise.

"Sound is tiring, and tired workers are more susceptible to plant accidents. Plant accidents in every state are compensable. Workers are susceptible whether the noise is sudden and short, or long and loud."

Mr. Weeks contends that the question to be asked by safety directors and plant managers should be: "Can I (develop) better workers and (make) higher quality products by controlling plant noise?" Not: "Is hearing loss in my state compensable?"

with the Grosse Ile Township Air Pollution Committee.

Robert C. McLaughlin, vice president-public relations, says McLouth has been working closely with an acoustical consulting firm, Bolt Beranek & Newman Inc., Cambridge, Mass.

"The adoption and completion of a program of sound control require a substantial period of time," Mr. McLaughlin says. "Accurate readings of sound must be taken at the points and throughout the area from which complaints arise. Recordings must then be analyzed and identified in the laboratories at Cambridge. Then a means must be devised, equipment must be ordered, manufactured, and installed.

"In certain instances, sounds which are brought under control may be found to have masked other sounds.

"The same program must be followed to control lesser sounds."

Here is some of the equipment installed by McLouth:

- **Sintering Plants:** Vibrators on cooler; replaced vibrators under cooler with rubber belt conveyor; acoustic baffles in cooler discharge stack; sound curtain wall; redesigned cutoff, ducts in main fan.
- **Blast Furnace:** Muffler on snort valves.
- **Powerhouse:** Mufflers on atmosphere exhaust, compressor, and turbine discharge.
- **Air Separation Plant:** Mufflers on each nitrogen discharge; silencers on high pressure oxygen relief valve and on exhaust steam from reciprocating oxygen compressors.

• **Tape "Silencers"** — Minnesota Mining & Mfg. Co. (St. Paul) researchers are reportedly working on sound abatement concepts that "could be of major importance" to the steel industry. Example: Vibration dampening of bridges.

Visco, elastic, pressure sensitive tape produced by 3M is now being used for Convair's new 880 jet airliner cabin. With an annealed, aluminum foil backing, the tape is designed to eliminate noise by reducing structural vibrations, thereby reducing aircraft fatigue.

• **Greatest Cost**—Most authorities agree that noise inflicts the greatest loss to industry in its damage to employee morale and efficiency and in costs for compensable hearing claims.

States are becoming increasingly conscious of hearing loss cases and are setting higher and higher maximum compensation benefits.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

breakthrough

BREAKTHROUGH IN METAL FINISHING! NEW OSBORN MASTER BLEND* BRUSHES . . . a totally new kind of power brush . . . in construction . . . in the unusually wide range of metal finishing jobs it can accomplish . . . in extra service life. You have never used a power brush like this before! • MASTER BLEND features fast-action straight wire cutting points blended with a tough plastic bond. Result: an exceptional precision power brushing tool that goes far beyond any brush you've ever used • Keeps its sharp profile for precision control over the working area throughout its long service life. Won't flare out • Scores big advantages over other accepted finishing methods. Can't rip or tear. Won't load up • Has extraordinary cutting power. Edge-blends and deburrs perfectly. Peening is kept to an absolute minimum, and—in many cases—is entirely eliminated. No compound required • Finishes more parts per hour, more parts per brush. Two years of research and on-the-job tests proved it. MASTER BLEND will outperform . . . outlast . . . any other power brush available. **FREE BULLETIN MB-100** includes MASTER BLEND Brush sizes, types, applications. Write or call *The Osborn Manufacturing Company, Dept. S-28, Cleveland 14, Ohio. Phone ENdicott 1-1900.*

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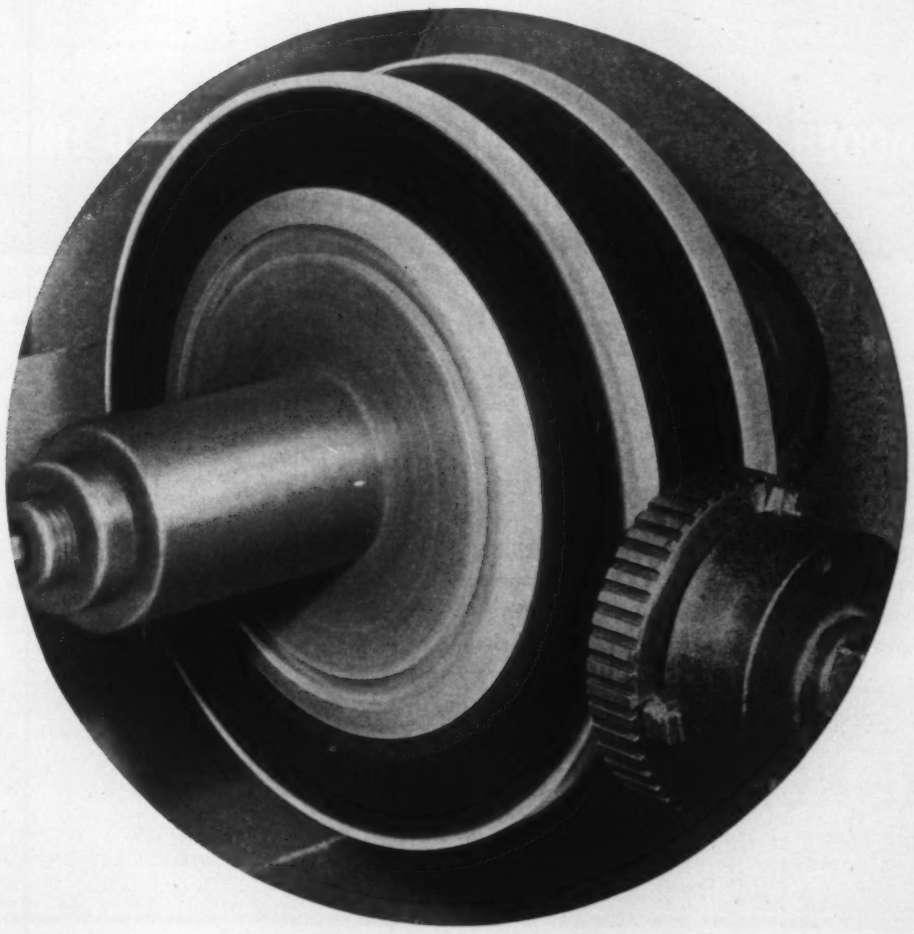
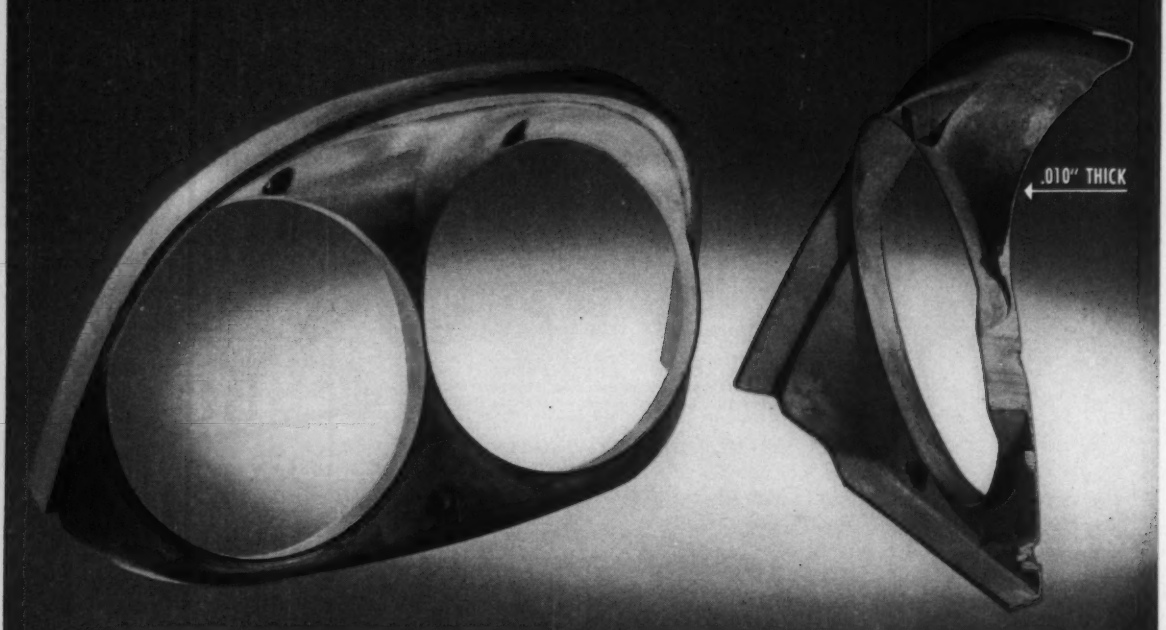


IT'S LIGHTER THAN YOU THINK!



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RIGID . . . DURABLE . . . ECONOMICAL

. . . WHEN DIE CAST with ZAMAK

Airfoil sculptured styling of today's automobiles demands parts designed to complement flowing body and fender lines.

ONLY ZINC DIE CASTING ALLOYS can produce the intricate shapes and smooth, compound-curve surfaces—as in this headlight door — with the necessary thin-wall sections, strength, rigidity and production economy.

Improved techniques in chromium plating on Zamak die cast parts provide a more permanent bright finish with greater resistance to corrosion than ever before.

The weight-saving advantages of ZINC die castings, with built-in qualities of durability and economy, point up the important reasons why Zamak has become the leading material for the production of die cast parts in today's automobiles.

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HORSE HEAD PRODUCTS ®

Weight Control Comes to Detroit

AUTOMOTIVE engineers are redesigning and respecifying parts and components to eliminate useless poundage. Their efforts have opened the door to a re-evaluation of types of steels and other materials that go into automobiles. Done properly, weight cutting results in lower costs too.

Discussing the weight cutting trend at last month's annual convention of the American Society of Body Engineers, H. L. Browne, manager of Ford Motor Co.'s Body Structures Dept., said: "Weight control gives the customer lower initial cost, better gas mileage, improved acceleration, and more durability. Engineering specifications of brakes, tires, engine, drive line, and suspension all can be reduced when body weight is lessened."

• **Why the Interest**—Motordom always has professed interest in curbing car weight, but during the V-8 reign, a few extra pounds didn't make much difference since cars had more than enough horsepower to tote the extra load. But the rapidly increasing demand for more economical automobiles plus rising manufacturing costs are forcing designers to give more than lip service to weight control of sprung and unsprung vehicle components. They're coming up with some interesting facts.

"In city-suburban driving, a compact car will gain about 1 mile per gallon with a weight reduction of 100 lb. Acceleration can increase 4 per cent," said Mr. Browne.

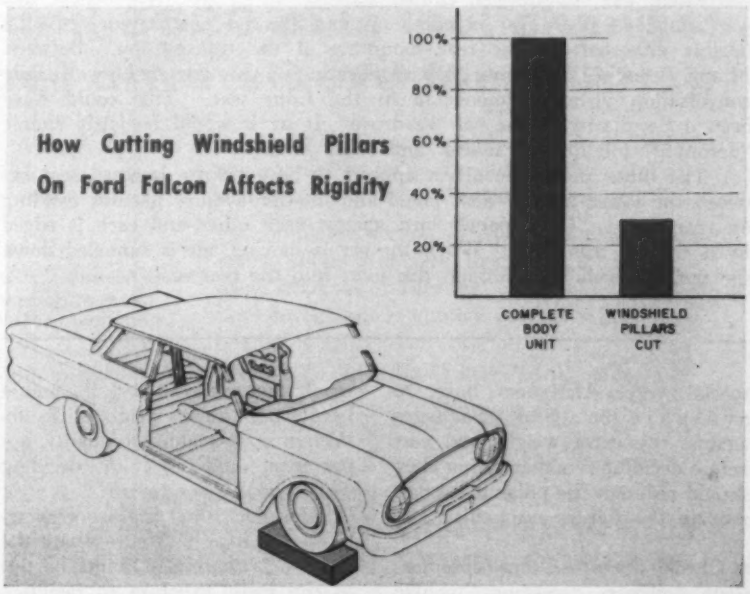
He pointed out that unitized body cars shorter than 200 in. will weigh less than the same size cars using body and frame construction. That's one reason unit bodies work so well for compacts. Difference in weight between the two types of bodies in cars that are 170 in. long is almost 400 lb. At 190 in., the differential drops to about 100 lb. Ford's charts show there's virtually no difference beyond 200 in.

• **Survey Designs**—Careful scrutiny of structure designs is one way to control weight, explained Mr. Browne. In one case, the shape of a fender made it necessary to increase metal thickness from 0.035 to 0.041 in. to prevent dimpling. That boosted finished fender weight from 43.5 to 51 lb per car. The blank weight increased from 88 to 103 lb. Finished piece costs rose 96 cents per car. Ford engineers modified the fender contours to cut weight and cost.

Mr. Browne claimed that generally a boxy style makes for more weight than rounded shapes because the flatter panels require more stiffeners and supporting members. The 1961 Thunderbird appears to be the best example of how Ford has retreated slightly from its former "crisp" styling look.

Analyzing the body in clay often tips off designers to weight sensitive spots in a car. "Some of the weight implications that show up in a clay model are obvious — larger or smaller bumpers, more or less glass area, and longer or shorter length," said Mr. Browne. Less obvious areas appear only if designers are consciously aware of the need to cut weight.

Take a recent problem with window regulators. One regulator contains seven pieces, weighs 2½ lb. The other has ten pieces and weighs 4¾ lb. Checking the clay reveals a thin center pillar which means the heavier regulator must be used because the glass has to move in a



Falcon engineers not only concern themselves with weight, but demonstrate the importance of strength in a vital area

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STEEL Drives Pontiac's Tempest

WE'VE just put 600 turnpike miles on a Pontiac Tempest station wagon to see if its radical drive train (STEEL, Sept. 12, p. 95) is as good as advertised.

The model driven was equipped with Pontiac's 195 cu in., four cylinder engine with single carburetor and a straight stick. Full retail price is about $2760.

Fuel consumption for the trip averaged 21.2 mpg at driving speeds ranging between 65 and 75 mph. Average speed including stops was 58 mph.

Manufacturing quality was found satisfactory and the car handled well on turnpikes. Steering impressed us most favorably. It's highly responsive, almost like a sports car. Visibility is good, although a side view mirror is a must. Rear seat legroom is not enough when the front seat is all the way back. We'd prefer to have the extra legroom at the expense of cargo space in the rear.

Frankly, we think the 110 hp engine is too light for this 3090 lb wagon, although it should be fine for the Tempest sedan. The 155 hp, aluminum V-8 should do a better job.

There was definite gear chatter starting out in low. We believe this was simply a poor gear combination and has no connection with the flexible driveshaft or the rear mounting of the transmission. Between 74 and 77 mph, a harmonic "boom" vibrating up through the firewall made conversation virtually impossible in the front seat. This could have been a peculiarity of the car we drove. If so, it would be fairly simple "detuning" job for the squeak and rattle boys.

The other noticeable defect appears to be a poorly designed seal between the lower interior door panel and interior window garnish molding on rear doors. These panels butt against each other and each is edged by a chrome trim strip. When the car is moving, air is funneled down the window well and through this joint into the rear seat.

---

special way. Designers have to evaluate the styling advantages against the extra weight and cost before deciding whether or not they should redesign the pillar to accommodate the lighter mechanism.

• **Check Specs** — Other specifications designers investigate include weight analysis of headliners. Ford found that for one car a cloth headlining assembly weighed 3 lb, a vinyl liner weighed 3½ lb, and a hardboard liner weighed 7 lb. Weight now is added to quality, appearance, and cost in deciding which headliners to use.

"Manufacturing engineers sometimes specify that more than the minimum number of joints be put in the body structure to facilitate assembly," reported Mr. Browne. Ford surveyed one compact car body and discovered 450 ft of coach and lap joints which added 60 lb to the car's weight. You can bet that body engineers had to justify each one of those joints before the car was released for production.

• **Aids Suppliers**—Increased awareness of weight control is a boon to material suppliers because designers have become more open minded to proposals that will pare pounds. Steelmakers are the latest contestants in this arena. M. W. Lightner, vice president of United States Steel Corp.'s applied research program, reports that there are more than 30 high strength, low alloy steels that can replace what he calls the "common garden variety" steels used in vehicle bodies. "They'll save weight and cost less if used properly," says Mr. Lightner. He adds that such steels are used for bumpers on about 40 per cent of U. S. cars. They have reduced bumper weight 15 to 20 per cent.

U. S. Steel recently analyzed several conventional car frames made from hot rolled carbon steel weighing from 360 to 400 lb. The steel cost between $20 and $23 per frame. "Redesigning the frame in high strength steels resulted in a 23 per cent weight reduction and cut materials costs 10 per cent," reports Mr. Lightner.

U. S. Auto Output

Passenger Only	1960	1959
January	688,731	545,756
February	659,323	478,518
March	654,242	576,080
April	582,909	578,846
May	611,226	546,817
June	613,147	557,995
July	434,377	555,410
August	305,527	239,152
September	407,685	258,151
October	617,816	507,527
10 Mo. Totals	5,574,983	4,844,252
November		254,527
December		494,931
Total		5,593,707

Week Ended	1960	1959
Oct. 8	140,832	118,793
Oct. 15	144,056	133,430
Oct. 22	146,339	112,488
Oct. 29	150,019	101,616
Nov. 5	145,762†	63,451
Nov. 12	142,000*	64,233

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

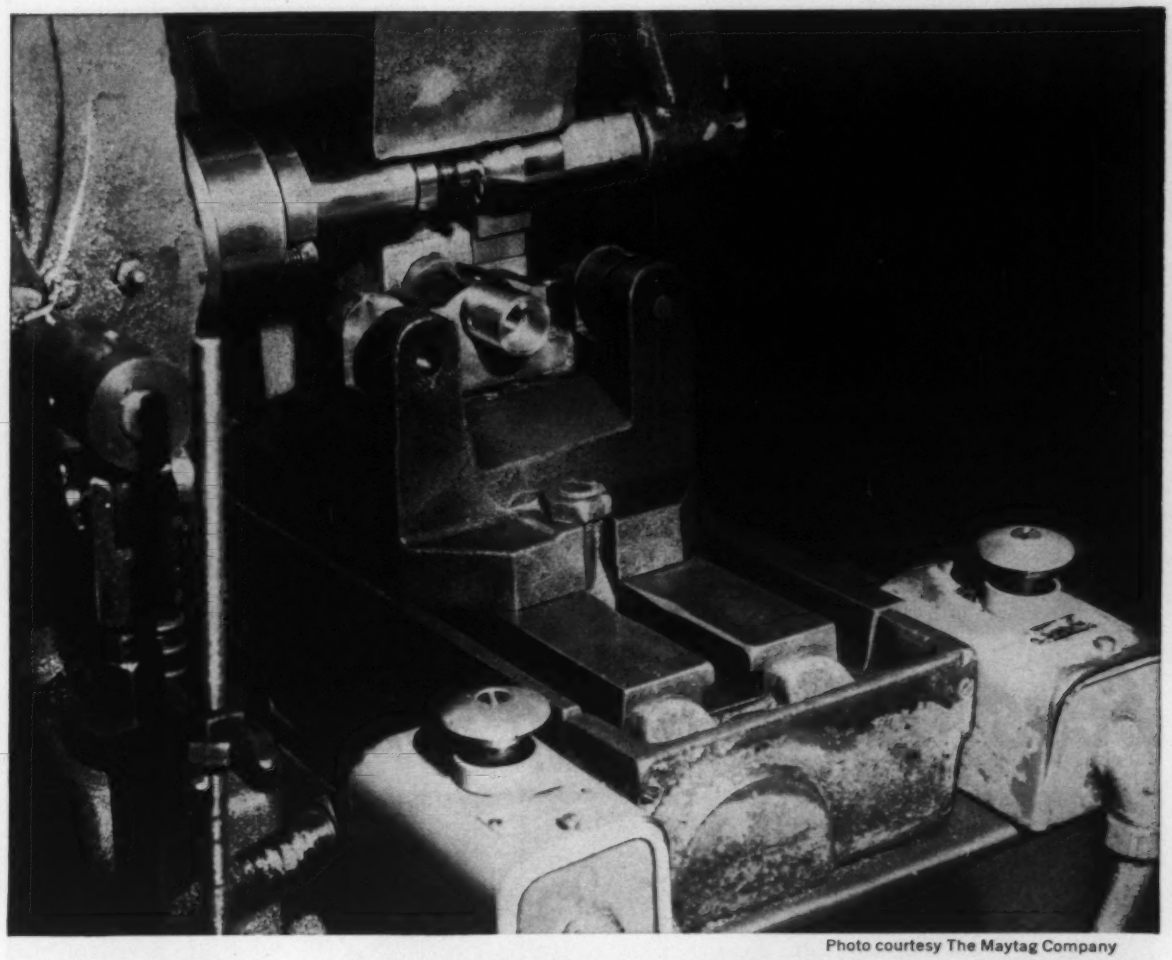

Photo courtesy The Maytag Company

Aristoloy Leaded 8620 cuts tool changes 50% on wringer drive sleeve for Maytag

Has working time been reduced? Yes.

In what way? The use of Aristoloy Leaded* has increased tool life and reduced downtime for tool changes.

Has machining been improved? Yes.

What inherent quality in the steel is responsible for improved machining? A more uniform, satisfactory microstructure provides better machining characteristics.

What operation is performed? Automatic screw machines bore, counterbore and cut off. Secondary operations include milling, drilling, internal and external grinding after carburizing.

For complete information about Aristoloy blooms, slabs, billets and bars, in carbon, alloy, stainless and leaded, call the Copperweld representative in your nearest large city—or write for NEW PRODUCTS & FACILITIES CATALOG.

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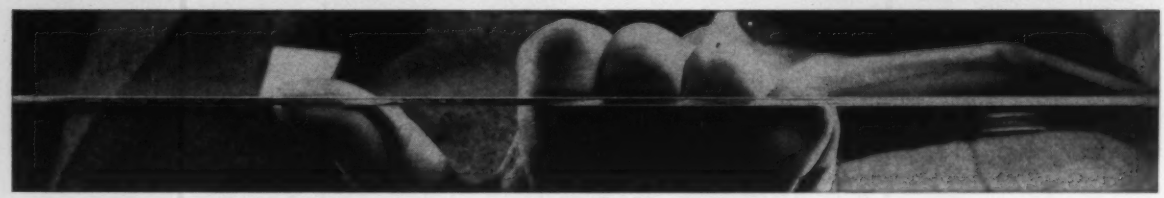

RB&W fastener survey uncovers use of special item which is replaceable by standard hex screw at much less cost

Of course you pay more for a "special" than a "standard" item—and that includes fasteners. So, when surveying a company's usage of fasteners, the RB&W Man looks sharply for the "specials"—and a valid reason for their use.

He could find no good purpose for the extensive use of screws with heavy head and milled body in one particular product. There was neither a specification requiring close fit in very close tolerance holes . . . nor were there exceptionally "sloppy" holes that called for an oversize head to span.

He therefore recommended assembly with standard RB&W High Strength Hex Screws. They would meet any physical requirement for the "special" being used... *but cost 30¢ less per unit.* Yearly total: $4500 more for *profits* instead of *costs.*

Are you *sure* you're not needlessly wasting dollars on fastener specifications? Let the RB&W fastener expert survey them. He's made proper fastener usage a science, is ready to cooperate with your engineers. Contact Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

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116th year

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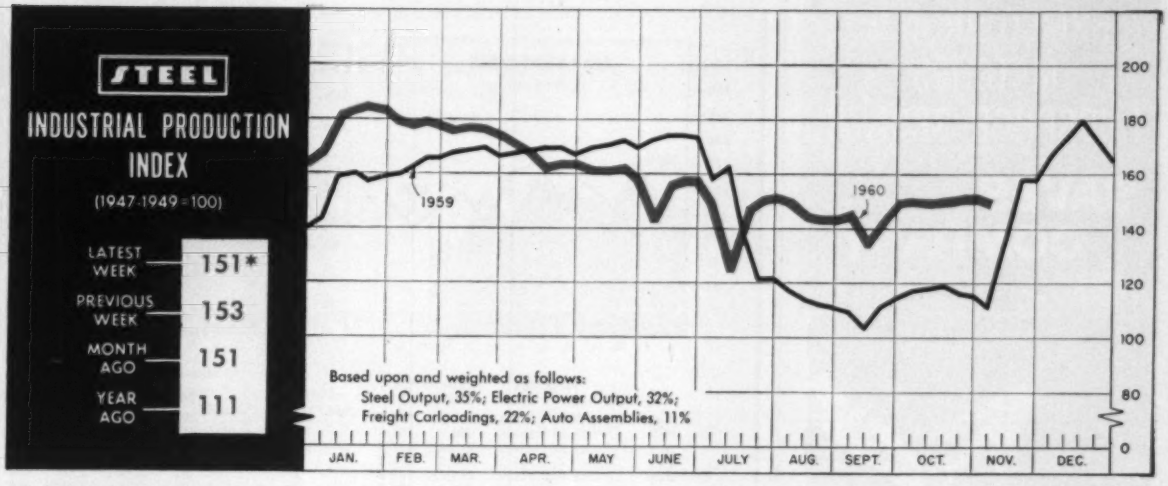


*Week ended Nov. 5.

Steel, Autos, Carloadings Decline

INDUSTRIAL PRODUCTION started out in November at the same place it stood in early October, but there was one important difference: The direction was down instead of up.

STEEL's production index (above) slipped 2 points during the week ended Nov. 5 to a preliminary 151 (1947-49=100) as three of the four component indicators deteriorated. The only bright spot was output of electricity, which is emerging from a seasonal slump. Outlook: Auto production and railroad freight carloadings will continue to drop off, and steel production will do well to hold above the 50 per cent of capacity mark. Electricity will continue to move ahead as cold weather and Christmas approach.

• **Auto Cutbacks Here** — Carmakers finally have acknowledged that their fourth quarter schedules were too high, but they haven't come up with what many consider as a realistic goal. (*Ward's Automotive Reports* says it is 1.8 million units compared with the original 1,921,000.) But with stocks of domestic and foreign new cars pegged at 1,027,000 units on Oct. 31, even record sales last month do not justify current announced plans, in the opinion of many observers.

The schedule for this month calls for 599,500 units. That's less than 20,000 under October's final tally of 617,816, which was 8 per cent under the initial scheduling. If November follows suit, the result will be close to 550,000 units, which is what many experts have been saying for some time.

• **No Help for Steel**—Auto production isn't going to help the steel industry, which has seen its ingot production drop from 1,579,000 tons a week in mid-October to 1,464,000 tons last week. Industry spokesmen are still hoping to remain above the 50 per cent operat-

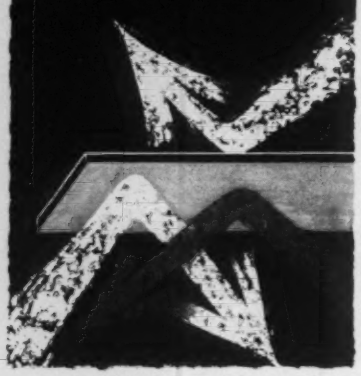
BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,464[1]	1,478	1,291
Electric Power Distributed (million kw-hr)	13,950[1]	13,883	13,019
Bituminous Coal Output (1000 tons)	8,000[1]	8,490	7,934
Crude Oil Production (daily avg—1000 bbl)	6,820[1]	6,821	6,899
Construction Volume (*ENR*—millions)	$373.4	$320.8	$254.2
Auto, Truck Output, U. S., Canada (*Ward's*)	171,617[1]	175,083	81,922
TRADE			
Freight Carloadings (1000 Cars)	600[1]	621	561
Intercity Truck Tonnage (changes from year ago)	−4.1%	−1.5%	+3.1%
Business Failures (Dun & Bradstreet)	331	270	273
Currency in Circulation (millions)[3]	$32,102	$32,120	$31,924
Dept. Store Sales (changes from year ago)[3]	+3%	+4%	+7%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$29,427	$27,424	$24,541
Federal Gross Debt (billions)	$290.5	$291.2	$291.2
Bond Volume, NYSE (millions)	$25.1	$30.0	$26.2
Stocks Sales, NYSE (thousands of shares)	13,462	15,863	13,884
Loans and Investments (billions)[4]	$107.4	$105.6	$104.3
U. S. Govt. Obligations Held (billions)[4]	$29.6	$27.8	$28.2
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	222.5	222.5	227.8
All Commodities[7]	119.0	119.0	119.2
Commodities Other than Farm & Foods[7]	127.5	127.6	128.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,849,306; 1959, 2,831,846. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

BRMCO BRONZE MATCHES PHOSPHOR BRONZE

SAVES COMPANY 21%



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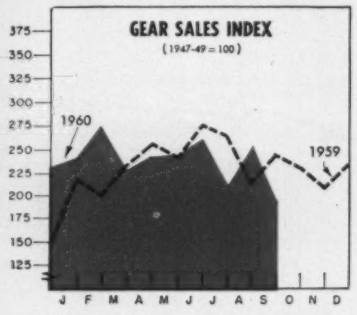
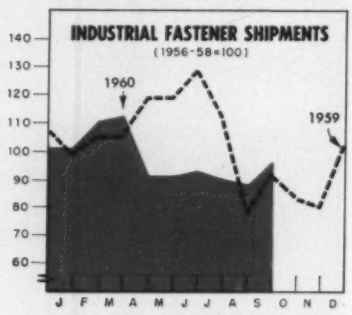
THE BUSINESS TREND



	Bookings		Shipments	
	1960	1959	1960	1959
Jan.	243.4	218.6	207.3	187.7
Feb.	278.6	199.9	230.2	201.5
Mar.	231.8	234.3	244.6	222.7
Apr.	249.2	255.6	234.8	231.8
May	246.9	241.0	241.3	223.9
June	269.8	274.2	253.6	239.7
July	217.5	262.8	210.8	199.8
Aug.	255.8	213.3	217.3	204.3
Sept.	197.9	213.9	223.5	216.1
Oct.	....	230.5	....	224.1
Nov.	....	208.7	....	224.2
Dec.	....	233.9	....	250.2
Avg	....	234.7	....	218.8

American Gear Mfrs. Assn.
Charts copyright, 1960, STEEL.



(Seasonally adjusted)

	1960	1959	1958*	1957*
Jan.	102	99	133	173
Feb.	111	105	117	177
Mar.	103	105	103	166
Apr.	92	119	102	157
May	92	119	111	168
June	94	129	120	162
July	91	112	133	184
Aug.	89	77	120	155
Sept.	97	92	141	159
Oct.	...	83	137	162
Nov.	...	80	134	147
Dec.	...	102	152	140
Avg	...	101	125	162

*1947-49=100.
Industrial Fasteners Institute.

ing level the rest of the year (it's 51.4 per cent now), but they admit that something is going to have to develop to take up the automotive slack. So far nothing has.

• **Ore Season Closing** — Railroad freight carloadings have been sliding for three consecutive weeks, and with the impending close of the Great Lakes ore shipping season, the decline is likely to extend well into November. However, the dropoff will not be as great as in some recent years because a good-sized portion of the fleet has been laid up for several weeks. At latest count, only 57 per cent of the ships were still operating.

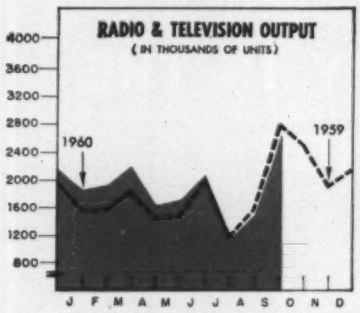
See Upturn in Second Half

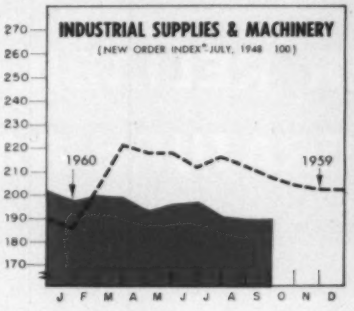
Business forecasts and falling leaves fill the air these days, and they have one thing in common—direction. The optimists are distinguished from the pessimists mostly by the terms they use to describe practically the same thing. At the Pitt Conference on Business Prospects earlier this month, you could hear one analyst talk about the "high level stagnation" and another talk about a "mild dip."

Ernst S. Erickson Jr., associate economist for E. I. du Pont de Nemours & Co. Inc., predicted a low point on the Federal Reserve Board's industrial production index of 100 (1957=100) in the first half (compared with 107 in September). He thinks a rise will start in the second half. But it will not regain the previous peak of 111 set last January. The 1961 average will be 103, he feels.

John J. Balles, vice president and economist, Mellon National Bank & Trust Co., Pittsburgh, does not believe the FRB index will go as low as 100, nor will the gross national product break through $495 billion on the downside. "Expansive forces are such as to keep the downturn from being too severe," he told the conference.

In agreement was J. A. Livingston, financial editor of the *Philadelphia Bulletin*, who declared: "The next President . . . will continue what the Eisenhower administration has been doing in the last few months—injecting federal adrenalin into the economy" and preventing the decline from gathering momentum. In fact, he does not see much change in the FRB index in the next four or five months. He looks for the big switch to compact autos to "quickly obsolete the 1957,





	Radio		Television	
	1960	1959	1960	1959
Jan. ...	1,356	1,125	526	437
Feb. ...	1,442	1,125	503	460
Mar. ...	1,668	1,348	550	494
Apr. ...	1,230	1,040	423	389
May ...	1,277	1,040	442	432
June ...	1,551	1,430	519	571
July ...	890	829	269	350
Aug. ...	1,048	1,009	462	547
Sept. ...	1,945	1,981	679	808
Oct. ...	....	1,796	...	707
Nov. ...	....	1,316	...	561
Dec. ...	....	1,553	...	593
Totals ..	....	15,622	...	6,349

Electronic Industries Association.

	1960	1959	1958	1957
Jan.	198	186	163	221
Feb.	200	202	157	219
Mar.	199	221	149	210
Apr.	194	218	148	203
May	196	218	152	199
June	197	212	164	199
July	191	216	170	197
Aug.	190	212	172	197
Sept.	190	207	178	203
Oct.	...	204	187	192
Nov.	...	202	189	180
Dec.	...	202	190	167

*Seasonally adjusted.
Amer. Supply & Machinery Mfrs.' Assn.

1958 and 1959 dinosaurs" and cause a convincing upturn in the automotive market about May or June.

The immediate outlook for housing is not good, admits Wade W. Hildinger, vice president of marketing, National Gypsum Co. But he told the conference that strength will begin to develop near the second quarter of 1961 which will bring the first half up to or slightly ahead of its 1960 counterpart. The rise will continue throughout the year and into 1962 where a new high plateau will be reached. Somewhere in 1963 or 1964, the real housing boom will begin.

Gear Sales Slide

Analysts who keep tab on the leading indicators claim that the latest information on gear sales confirms their belief that a recession is shaping up. (The indicator is classed as one of the ten which historically moves in advance of the FRB index.) Bookings in the latest month dropped to the lowest point since December, 1958. (See graph and table, Page 88.)

During the post-World War II period, gear sales have been a good forecaster of economic recessions. Prior to the 1947-49 adjustment, the gear industry sloughed off ten months in advance. It led the downturn of 1953 by three months and the recession of 1957-58 by ten months. If the economy started to slide this time in August, as many believe it did, gear sales again led the trend by five months.

But the score is not so impressive on the up side. Only in 1949 did it lead the recovery (three months). In the following two cycles, it lagged the upturn by three or four months.

Also, there have been considerable periods when gear sales seemed to have no relation to the over-all trend. In 1950-51 when the FRB index was practically stable, gear sales rose rapidly to record heights. When they dropped precipitously in early 1952, the FRB index held firm and then started the rise which took it to the peak in mid-1953.

As with the other leading indicators, it is unwise to base forecasts and business plans on it alone. Case in point: Of the three analyzed so far (starting with machine tools in the Oct. 24 Business Trend column and following each week) one has been up, one down, and one inconclusive.

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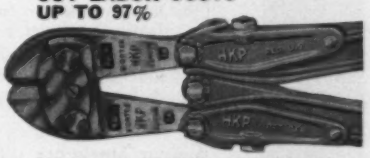

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NORMAN W. KIMMEL
Dana purchasing dir.

ROBERT F. STEWART
Joy Mfg. positions

D. WHEELER CLARK
Milford Rivet gen. sales mgr.

EDWARD WEISSMAN
Jacobson Nut v. p.

Norman W. Kimmel was made director of purchasing and production control, **Dana Corp.**, Toledo, Ohio. He was plant manager, Ft. Wayne, Ind., Div.

Robert F. Stewart was elected a vice president of **Joy Mfg. Co.**, and general manager of its **Western Precipitation Div.**, Los Angeles. He was assistant general manager.

George E. Parker was made assistant sales manager, **Cincinnati Milling Products Div.**, Cincinnati Milling Machine Co., Cincinnati. He was district sales manager in the division's Chicago office, and is succeeded by **Charles E. Reichel.**

Harry E. Schroeder was appointed vice president-engineering, **Mondie Forge Co.**, Cleveland.

Frank A. Ryan was named vice president and general manager of Western operations for **United Aircraft Products Inc.** He also heads the firm's Gardena, Calif., plant.

D. Wheeler Clark was appointed general sales manager, **Milford Rivet & Machine Co.**, Milford, Conn. He joined the firm early last year as assistant to the president. He was field sales manager of Farrel-Birmingham Co. Inc.

Robert Young was appointed president and general manager, **Budd Electronics Inc.**, Long Island City, N. Y. **Jerome L. Strauss**, former vice president, fills a new post as senior vice president.

J. Walter Wallace was named general sales manager, **National Bearing Div.**, Meadville, Pa., American Brake Shoe Co. **George H. Bailey** was named Western sales manager for the division, and will be based in Oakland, Calif.

William E. Essery was made manager of sales administration, Coated Abrasives Div., **Armour Alliance Industries**, Alliance, Ohio. He was assistant sales manager for Mid-West Abrasive Co.

Edward Weissman was appointed vice president and general manager, **Jacobson Nut Mfg. Corp.**, Kenilworth, N. J. He has been with Jacobson for two years. He was co-ordinator of production control at Allen-Stevens Corp.

Charles G. Chisholm was appointed vice president - marketing, **Haynes Stellite Co.**, division of Union Carbide Corp., New York. He was general sales manager.

Winton A. Vagedes was made Cleveland district manager of **Norton Co.'s** Abrasive Div. He succeeds **Cheever H. Ely**, selected for a special assignment in the New England district.

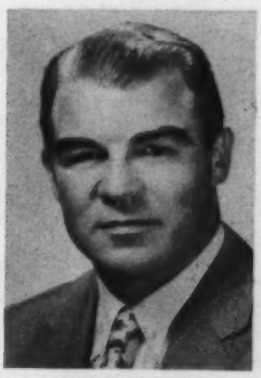
Fred W. Smith was appointed vice president and general manager, **Penn Machine Co.**, Johnstown, Pa. He was plant manager. **Robert J. Fox** was made general foreman in charge of all shop operations.

William Featherstone was made

FRANK A. RYAN
UAP's Western operations mgr.

J. WALTER WALLACE
National Bearing sales

WILLIAM E. ESSERY
joins Armour Alliance div.



FRED W. SMITH
Penn Machine v. p.

JOHN L. HALLETT LOUIS H. OPPENHEIM FRANKLIN T. MATTHIAS

Kaiser organizational vice presidents

product sales manager, West Coast Div., **Hubbard & Co.**, Chicago.

John L. Hallett and **Louis H. Oppenheim** were appointed vice presidents of **Kaiser Industries Corp.**, Oakland, Calif., and **Franklin T. Matthias** was appointed vice president of **Henry J. Kaiser Co.**, Oakland. Mr. Hallett is general manager of Kaiser Engineers International, division of Henry J. Kaiser Co. of which he also is a vice president. Mr. Oppenheim is general manager of Kaiser Engineers and a vice president of Henry J. Kaiser Co. Mr. Matthias is manager of heavy construction for Kaiser Engineers.

Sam Michaels was made vice president-administration, **Pittsburgh Annealing Box Co.**, Pittsburgh.

John E. Eckert was appointed vice president - engineering, **Waterbury Farrel Foundry & Machine Co.**, Waterbury, Conn., division of Textron Inc. He was chief engineer, Rolling Mill Div., and is succeeded by **Andrew J. Beck. Lawrence J. Litalien** was appointed purchasing agent.

William H. Grinold, vice president-operations, was elected president of **Wallingford Steel Co.**, Wallingford, Conn., subsidiary of Allegheny Ludlum Steel Corp., effective Jan. 1. He succeeds **Edmund B. Cleborne** who retires at the end of the year. **Guy Cleborne** was elected vice president in addition to his office of treasurer.

John R. Tench was made vice president - sales, industrial batteries, **Gould - National Batteries Inc.**, Trenton, N. J. He succeeds **M. W. Heinritz**, former vice president of industrial sales, who remains with the company as a vice president and will be associated with the Industrial Div. in an advisory capacity.

Wolverine Tube Div., Calumet & Hecla Inc., appointed **E. C. Walter** manager of the modernized Detroit plant; **V. A. Zatell** manager of the division's new special metals plant in Inkster, Mich.

William F. Nagel Jr. was appointed manger-tin plate metallurgy for the Central Operations Div. of **United States Steel Corp.**, Pittsburgh. He succeeds **John N. Crombie**, retired.

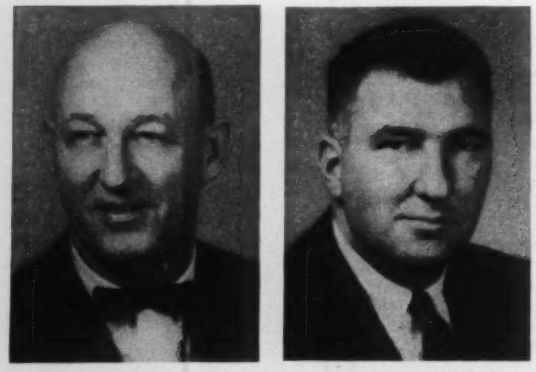
William F. Wahlenmaier was made director of marketing, Pump & Hydraulic Div., **Fairbanks, Morse & Co.**, at Kansas City, Kans. New plant managers for the division include: **C. Harold Johnson**, Kansas City Works; **W. Paul McAnally**, Stuttgart, Ark., Works; and **T. Ray Mackay**, Pomona, Calif., Works.

James A. Marohn, former executive vice president of Leece-Neville Co., joined **Acme Steel Co.**, Chicago, as financial vice president. **Fred M. Gillies**, chairman of the executive committee, has reached retirement age, but remains with the company as senior consultant for steel operations.

Bernard M. Korn was elected treasurer of **American Steel Foundries**, Chicago. **L. T. Moate**, former vice president-treasurer, now will devote his efforts to his position as vice president in charge of the Finance & Legal Div.

Forbes Morse was elected a vice president of **Waltham Precision Instrument Co.**, Waltham, Mass. His election coincides with completion of the purchase of Electro-Mec Laboratory Inc., of which Mr. Morse was founder. He remains as president and operating head of Electro-Mec Div.

Richard A. Ruth was made sales manager, **Lafayette Steel & Alumi-**

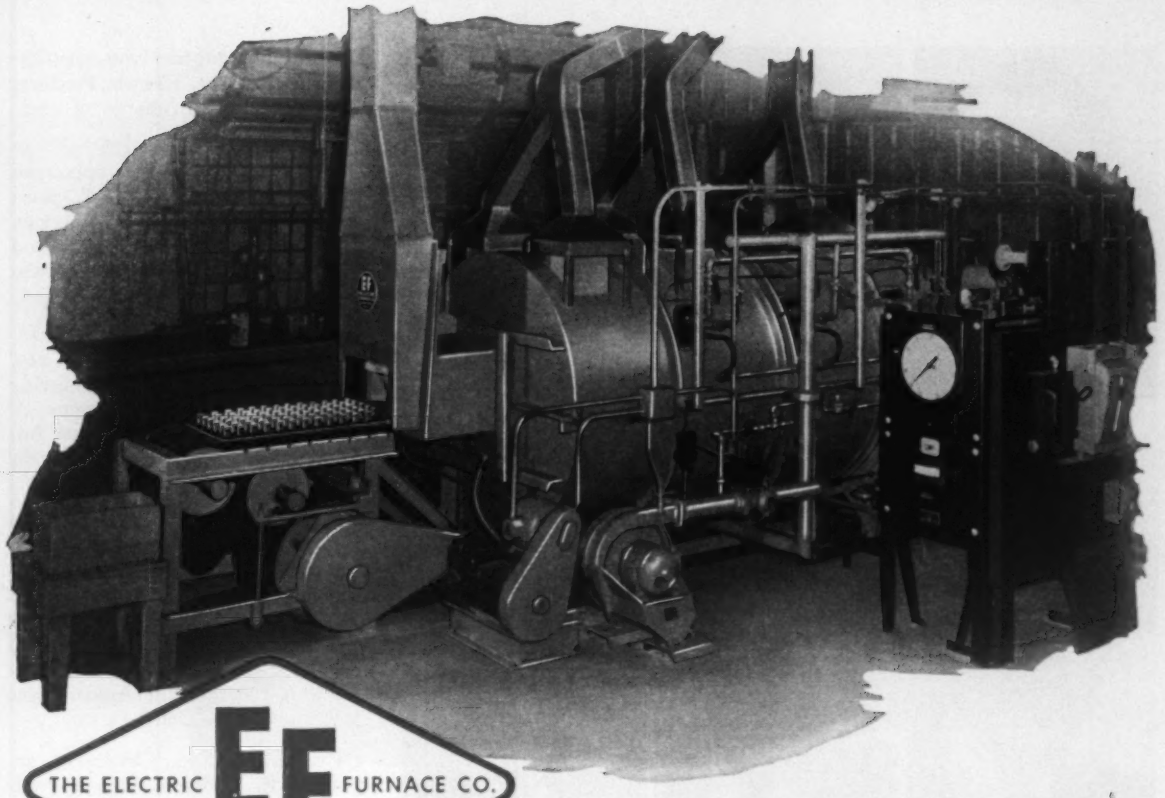


JOHN E. ECKERT LAWRENCE J. LITALIEN

Waterbury Farrel eng. and purchasing posts

E. C. WALTER V. A. ZATELL

Wolverine Tube plant managers



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EDWARD G. SCHROEDER
Electric Products v. p.

HAROLD P. McANALLY
American Bridge plant mgr.

RICHARD B. HOUGHTON
Acoustica-Calif. post

KEITH A. NEAL
CEC div. marketing dir.

HAROLD J. BILLINGTON JR.
H. A. Wilson Div. sales

RICHARD M. STAFF
Eastern Rolling Mills post

num Corp., Chicago. He replaces the late **William T. Holmes.**

Keith A. Neal was made marketing director, Data Processing Divisions, **Consolidated Electrodynamics Corp.**, Pasadena, Calif., responsible for those activities of the Datalab, DataTape, Transducer, and Electro Mechanical Instrument Divisions.

Richard Miller was appointed manufacturing manager at **Buhr Machine Tool Co.**, Ann Arbor, Mich.

George H. Johnson was made general superintendent of production at **Chevrolet Motor Div.'s** aluminum foundry, Massena, N. Y., General Motors Corp. He succeeds **John D. Debbink,** named to a similar post at Chevrolet's axle plant at Buffalo. Mr. Johnson is succeeded as general superintendent of production at the Tonawanda, N. Y., plant by **James W. McLernon,** who is replaced by **Sidney S. Hulse** as general superintendent of production at Chevrolet-Tonawanda.

Harold J. Billington Jr. was named sales manager of **H. A. Wilson Div.**, Engelhard Industries Inc., at Union, N. J.

Richard M. Staff was made assistant to the president of **Eastern Rolling Mills Inc.**, New York. He was plant manager, and is succeeded by **Murray Weinberg** who joined the company in June after serving ten years as project engineer and administrative engineer of BG Corp.

L. R. Burger was elected vice president of **Logansport Machine Co. Inc.**, Logansport, Ind. He is in charge of sales.

S. Arthur Santuccio, former president and treasurer, General Strapping Co., was elected president of **Harrison White Inc.**, New York, parent company of GSC.

Neal H. Hutchison was made director of purchases for the Cleveland Div. of **Midland-Ross Corp.** He succeeds the late **Howard Lemmerman.**

Edward G. Schroeder was appointed vice president, **Electric Products Co.**, Cleveland, in charge of engineering and sales.

Harold P. McAnally was appointed manager of the Elmira, N. Y., plant of U. S. Steel Corp.'s **American Bridge Div.** to succeed **Raymond Vreatt,** retired. Mr. McAnally was assistant plant manager, Gary, Ind., plant.

Richard B. Houghton fills the new post of vice president-engineering for the California operations of **Acoustica Associates Inc.**, Los Angeles. He was assistant program director.

H. Brown Reinhardt was named Eastern sales manager for **American Manganese Steel Div.**, American Brake Shoe Co. He succeeds **E. J. Nist,** who reached retirement age, but will continue to represent Amsco in the Southeast. Mr. Reinhardt is based at the Amsco plant in New Castle, Del.

OPW-Jordan Corp., Cincinnati, appointed **R. J. Peters** manager-product and market research; **M. W. Hott** manager - engineering. Mr. Peters was advertising manager and regional sales manager and retains his field responsibilities, in charge of sales in the Southeastern states. Mr. Hott continues as manager of manufacturing. **T. E. Daly** was made regional sales manager, New England area, as well as several Midwestern states.

Thomas C. Pridmore was appointed sales manager, **Bradley Semiconductor Corp.**, New Haven, Conn. He was chief engineer.

Ralph L. Leaf was made sales manager, **Designers Metal Div.**, Southern Electric Inc., Chicago.

Harry D. Curtis was named assistant manager of **Solar Steel Corp.'s** Detroit Div.

OBITUARIES...

H. Stanley Ford, 67, former vice president and general manager, **Bigelow-Liptak Corp.**, Detroit, died Oct. 31.

Theodore H. Wickwire Jr., 81, chairman of **Trent Inc.**, Philadelphia, died Oct. 27.

Another Test System at work...

A. J. De Vries, Magnaflux Field Engineer, checks up the Magnaflux installation at the Chicago Screw Company Division of Standard Screw Company with Hugh J. Maplesden, Superintendent of Inspection. Unit tests wide variety of high quality bolts and similar parts used in heavy equipment, diesel engines, stamping dies, etc.

Low Cost Testing with Magnaflux— Accessories Adapt to Low or High Volume!

This testing installation is a "productionized standard" Magnaflux unit. The basic standard unit, Model TAQ-524, is fitted here with a bath applicating device, a short conveyor for proper positioning and orientation of the parts and an accessory sequencing control cabinet. Reliability and reproducibility of test results are assured and the test operation is an efficient integral part of the plant operation.

An auxiliary conveyor unit carries the parts from the TAQ to the inspectors and on through automatic demagnetization. Thus, high production rates are easily attained, when required. Varieties of shapes and sizes are readily processed.

This is a specific example of a broadly applied concept: "productionize" any of the standard Magnaflux units by employing standard or easily adaptable auxiliary components, all available from Magnaflux Corporation.

Phone or write our local Field Engineer, or write to Magnaflux Corporation, 7312 West Lawrence Avenue, Chicago 31, Illinois.

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A SUBSIDIARY OF GENERAL MILLS
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TEST SYSTEMS

MX Test Systems include MAGNETIC PARTICLE, FLUORESCENT PENETRANT, THERMOGRAPHIC, EDDY CURRENT, ULTRASONIC, STRESS ANALYSIS, RADIOGRAPHIC TESTING, DYE PENETRANT & MAGNETIC FIELD

DRILL ...SET... DRIVE

11B-3 Series Air Drills. Powerful and lightweight for continuous duty. Rated to ⅜" capacity. Pistol grip or offset handle, or short head. Also available as 11G-3 and 11HA-3 Series Angle Drills. ¼" and ⅜" rated capacities respectively.

16B-3 Series Nut Setters. Rated fastening capacity to ¼". Pistol grip handle or short head. Also available as 16G-3, 16H-3, 16HA-3 Series Angle Nut Setters. Wide range of attachments permits almost unlimited applications to ⅜" nominal capacity. Straight handle or short head.

12B-3 Series Screw Drivers. Nominal fastening capacity to ¼". Pistol grip, offset handle, or short head. Also available as 12G-3 Angle Screw Drivers; ⅜" rated capacity; straight handle or short head.

faster than ever before with NEW Gardner-Denver no. 3 series air tools

Here's a new line of air tools designed to keep any production line stepping faster than you've ever known. Drills, screw drivers, nut setters—in-line and angle types—are available with a complete selection of interchangeable attachments.

New, powerful air motor gives better performance with less noise than ever before. Motors used in the entire series are identical—permitting the wide range of versatility, adaptability and interchangeability.

Further versatility. All attachments used on the Series 2 basic motor unit are also adaptable to the new Series 3 basic motor unit—adding even greater flexibility to Gardner-Denver's complete line of air tools.

Get all the facts on this No. 3 series—the line designed with production in mind. See your Gardner-Denver air tool specialist or write for bulletins.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Ave., Toronto 16, Ontario

Lone Star Steel Enters New Markets

LONE STAR STEEL CO., Dallas, has undertaken a multimillion dollar expansion program that will carry the mill into new markets with several new products.

E. B. Germany, president, says the production of spiral weld pipe, standard grade pipe, and improved rod mill products will enable the company to compete in such markets as highway construction, large diameter water distribution systems, other types of transmission lines, and plumbing and building trades.

New and expanded facilities already authorized and slated to be in operation by the middle of next year:

- **Spiral Weld Pipe Mill**—It will be capable of making steel pipe in diameters from 16 to 80 in. Special lining and coating equipment is included.
- **Stretch Reducing Mill**—Added to the department which makes steel pipe for the oil and gas industry to API specifications, it will produce standard grade black and galvanized pipe. New equipment will allow coatings or linings of recently developed materials, such as epoxies and plastics.
- **Rod Mill**—This will be a major remodeling job. The revamped mill will use both kelp trim and prime metal, the latter to be obtained through the use of a slitting machine. The present equipment was designed to use only the material that is trimmed from the edges of skelp or coiled steel plate.

Allenair Enlarges Plant

Allenair Corp., Mineola, N. Y., added 20,000 sq ft of manufacturing and general office facilities. The firm makes air and hydraulic equipment.

Tubing Plant Pact Signed

Mannesmann - Meer A.G., Moenchengladbach, Germany, and the Loewy Engineering Co. Ltd., Bournemouth, England, have signed an agreement covering the construction and installation of plants for the production of seamless tubing by extrusion. It provides for technical co-operation, economic exploitation of the firms' manufacturing facilities, and for the utilization of the technical and engineering services and resources of Mannesmann-Meer Inc., Youngstown.

Baird Leases Machines

Baird Machine Co., Stratford, Conn., has made an arrangement with Equitable Leasing Corp., New York, under which manufacturers may lease Baird's automatic high production machinery.

New Furnace Installed

Metallurgical International Inc., Wallington, N. J., is using an atmospheric furnace for operation at temperatures in excess of 3632° F to serve the needs of the high temperature powder and pellet consuming industries. The company makes tungsten, molybdenum, and other refractory metal products.

Stauffer Renames Unit

Stauffer-Temescal Co., Richmond, Calif., changed its name to Stauffer Metals Co. On Jan. 1, 1961, the wholly owned subsidiary will become a division of the parent firm, Stauffer Chemical Co., New York.

Fabricator Broadens Line

Ravens - Metal Products Inc., Parkersburg, W. Va., is broadening its line of aluminum truck and trailer bodies and is expanding into new product groups: Aluminum tank trucks, aluminum flatbed trailers, and a new line of aluminum furniture. The program will more than double the size of the company, says L. A. Cook, president.

Seeks More Cement Outlets

Universal Atlas Cement Div., New York, U. S. Steel Corp., has secured options on three sites for cement distributing stations along the Eastern seaboard. They are at Norfolk, Va., Jacksonville and Port

(*Please turn to Page* 100)

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aircraft parts
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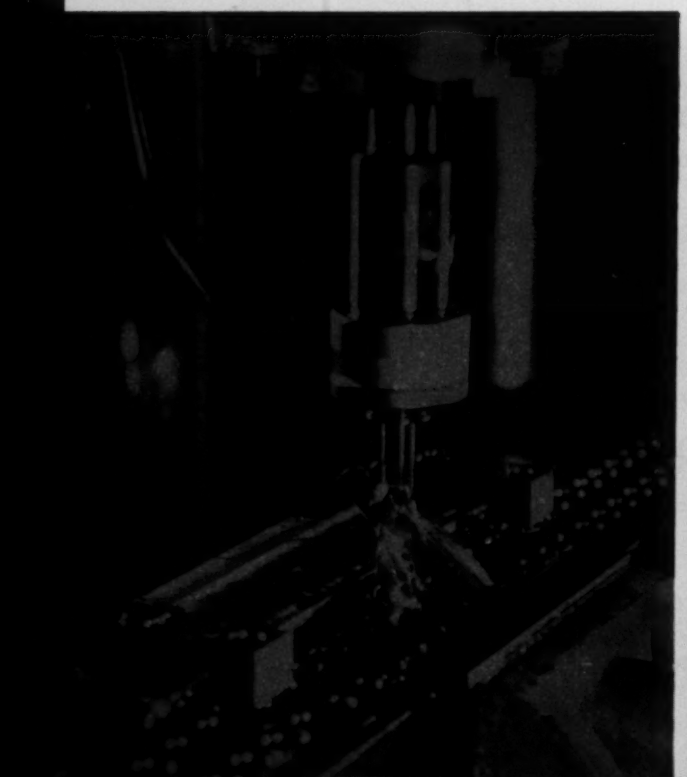
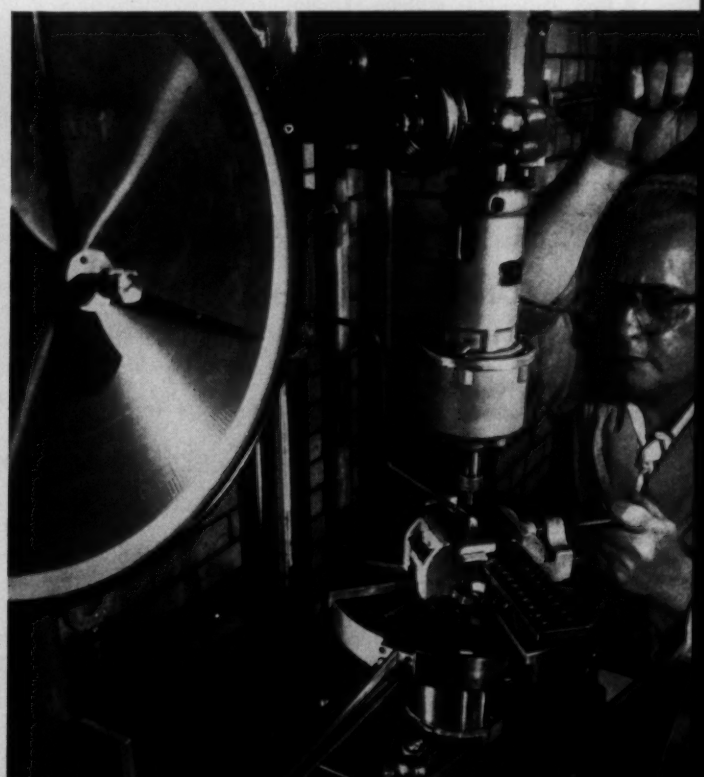
Announcing a major advance

Mobilmet Oils

the first multi-metal cutting fluids...
with unique pressure-temperature selective activity.

This Tapping Efficiency Tester is one of many Mobil research tools used in the development of cutting fluids such as Mobilmet . . . effectively evaluates the machining efficiency of cutting oils on soft, draggy SAE 1020 steel. On this difficult machining operation as well as in field service, Mobilmet oils have demonstrated results better than conventional cutting fluids intended for this application. Other applications for new Mobilmet oils include: Turning, Drilling, Boring, Milling, Gear Hobbing, Shaping and Shaving, Threading, Tapping, Pipe Threading, Surface and Internal Broaching, Thread and Form Grinding, Thread Rolling, Forming and Special Automatic Screw Machine Operations.





in cutting-oil technology...

Now... from Mobil Research... versatile new cutting fluids that offer you: • greater machine output • lower tool costs • reduced loss from rejects... over wide ranges of metals and operations!

Now, after two years of exhaustive research and field testing . . . new Mobilmet* oils—the first multi-metal cutting fluids ever offered to the metalworking industry.

Mobilmet oils are uniquely versatile . . . help simplify your cutting oil requirements because each grade is effective over ranges of metals and operations beyond the capacity of any conventional product. And Mobilmet oils offer you superior machining results as well—in terms of improved finishes, longer tool life, and reduced staining.

Behind this versatility and effectiveness: a new additive composition, developed and patented by Mobil, which is *pressure-temperature selective* in its activity—highly effective over the wide ranges of cutting pressures and temperatures produced in machining various metals with greatly different physical characteristics. As a result, Mobilmet oils are useful for both tough, draggy metals and hard, brittle metals.

Call your Mobil Representative, or use the coupon below.

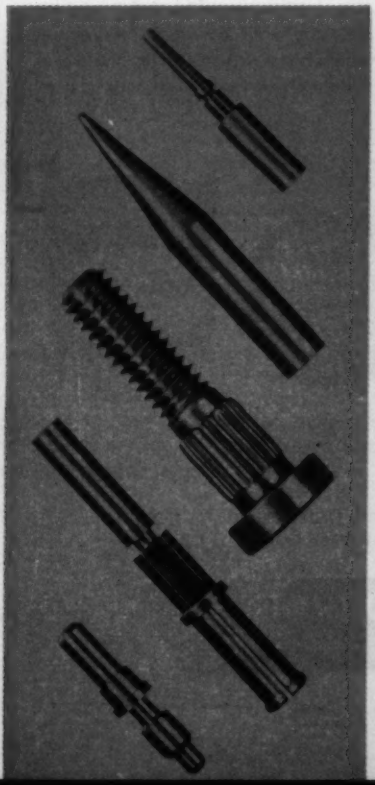
Mobil

*Mobilmet is a trademark of Socony Mobil Oil Company, Inc.

MOBIL OIL COMPANY, 150 East 42nd Street, New York 17, N. Y.

Mobilmet oils offer superior tool life on both soft, draggy metals and hard, clean-cutting materials. These pipe threading chasers used for six weeks in moderately severe job-shop service show little wear on either tool faces or thread crests. Results were achieved with heavy-duty Mobilmet oil.

Since they effectively control built-up edge and tool wear, Mobilmet oils provide superior finishes that meet exacting specifications—with fewer rejects, and in some cases reduced necessity for additional finishing operations.



Stain-inhibiting effect of new additive combination is demonstrated with two steel plates. Plate on the left was immersed in conventional corrosive cutting oil; plate on the right was immersed in heavy-duty Mobilmet grade intended for the same application. Re-polished tops of plates show original condition.

Mobil Oil Company, Room 2057-D
A Division of Socony Mobil Oil Company, Inc.
150 East 42nd Street, New York 17, N. Y.

Gentlemen: I am interested in learning how Mobilmet oils can improve metal-cutting operations at my plant. Contact me about setting up an evaluation program.

*Name*_____

*Position*_____

*Company*_____

*Address*_____

*City*_____ *State*_____

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FABRICATED ALLOYS

HEAT AND CORROSION RESISTANT

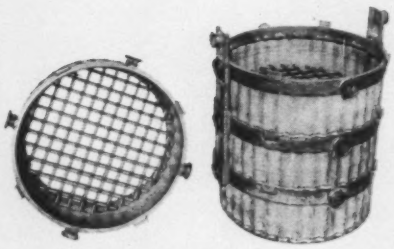
some need 'em **HEAVY**
some prefer 'em LIGHT
but everybody benefits from
BALANCED DESIGN FEATURES
OF **ROLOCK**
FURNACE BASKETS

Most of our customers, naturally, insist that furnace baskets be rugged, with more-than-ample safety factors . . . and maximum service life.

But Rolock's long and specialized engineering experience shows that no one design concept can meet all service conditions . . . and that sheer weight in heavy castings or oversize sections does NOT insure either safety or long service. Where reduction can be achieved in the weight of baskets and fixtures, this means more "payload" and lower fuel costs.

That is why Rolock designs and builds baskets to meet the individual customer's job needs, using many PROVEN basic design features pioneered by us in this field . . . corrugated, plain sided, or perforated . . . with or without Rolock pressure-welded grids and screens . . . in types and sizes for all popular pit-type furnaces . . . or with custom features to meet special requirements.

Rolock experience can be extremely helpful in cutting furnace-hour basket costs . . . in suggesting how to expedite flow of work . . . in aiding efficient quality control. Write us and see.



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Easier Operation, Lower Cost

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(*Concluded from Page 97*)

Canaveral, Fla. A foreign U. S. Steel subsidiary, Navigen Co., Nassau, Bahamas, has secured an option for property and cement manufacturing rights at Freeport, Grand Bahama Island.

Arrow Tool Renames Unit

Mech-Tron Engineering Corp. is the new name of the engineering division of Arrow Tool Co., Wethersfield, Conn. It was formerly Mech-Tron Instrument Corp. The parent company develops and produces tools, precision mechanical and electromechanical components for business machines and instrument systems.

Plans Record Expansion

Borg-Warner Corp., Chicago, will spend a record $40 million on new plants and equipment in 1961, says R. S. Ingersoll, president. About three-fourths of the amount will go into domestic expansion and modernization, and the balance into facilities in other countries. Dr. D. W. Collier has been appointed vice president-research.

Trane Enlarges Facilities

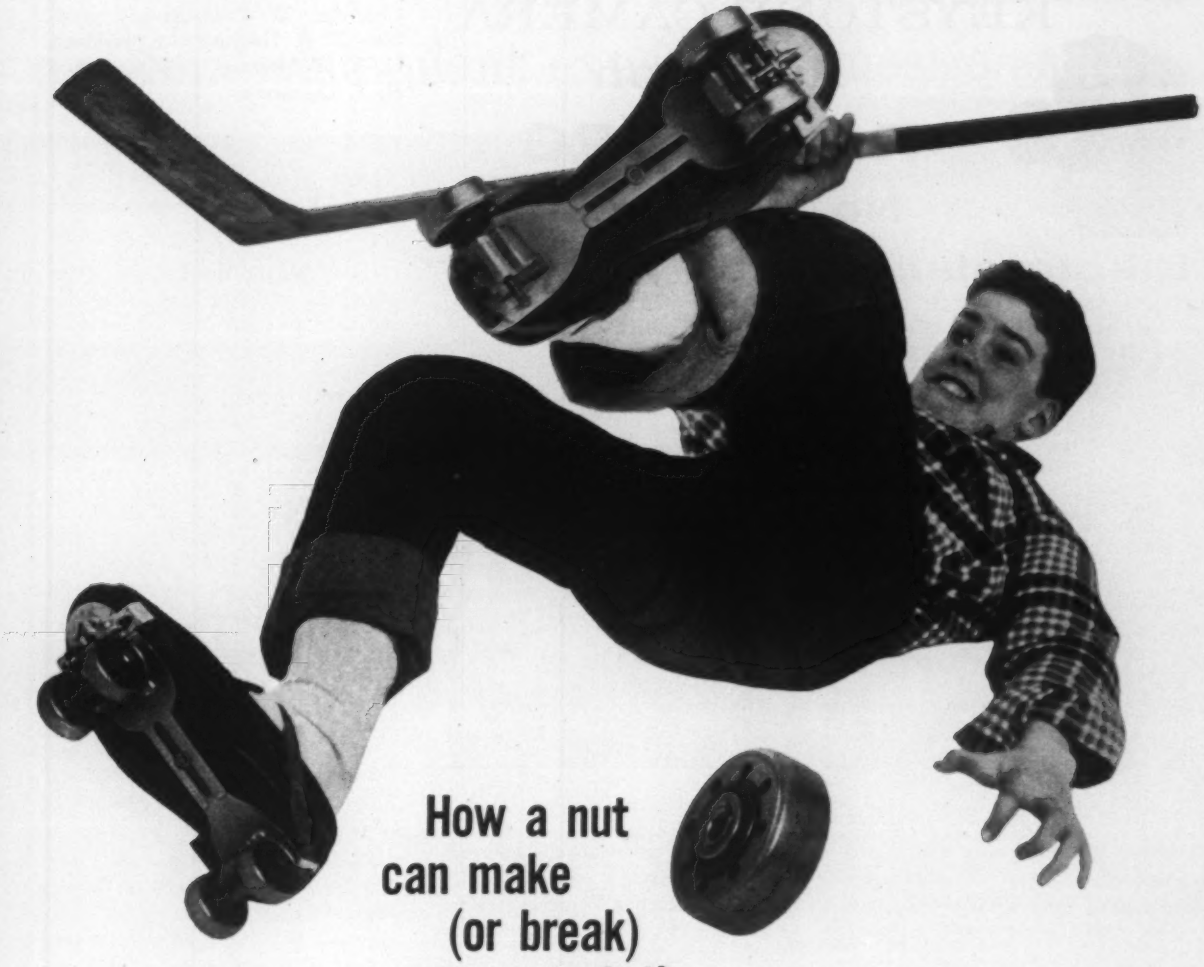
Trane Co., La Crosse, Wis., is expanding its facilities at a cost of about $1.4 million, including equipment. The company will build a 52,000 sq ft addition to its warehouse and a 40,000 sq ft addition to its No. 4 plant.

Pfaudler Enlarges Plant

Pfaudler Co., a division of Pfaudler Permutit Inc., is erecting a $1 million addition to its manufacturing facilities on West Avenue, Rochester 3, N. Y. Installation of a $350,000 gas furnace for making glassed-steel equipment will be included in the expansion.

American Emblem Expands

American Emblem Co. Inc., Utica, N. Y., has been acquired by a group of businessmen in that city. The new owners are investing in additional production equipment and are planning a long range expansion program to broaden the scope of the firm's products. Officers include:



How a nut can make (or break) your reputation

. . . and even bring in re-orders

A nut comes loose. A wheel comes off. And down comes Billy! No great loss, except perhaps to his dignity. But when a lost nut knocks out a rock drill, or a tractor, or a piece of the heavy equipment that *you* make—then what?

Down goes the machine! *Down* goes production—for no telling how long! *And down goes your reputation as a maker of quality equipment!* You can blame it on the nut, but your customer blames *you!*

This kind of embarrassing and costly "Reliability" failure simply cannot occur when you specify Elastic Stop® nuts for critical bolted connections. For no matter how rugged or repeated the shock or impact, no matter how bone-shaking or constant the vibration . . . Elastic Stop nuts *simply will not work loose!*

Elastic Stop nuts with their exclusive, vibration-damping nylon locking inserts are nothing new. They have been widely used for over 20 years by an increasingly large number of quality-conscious manufacturers who have learned that Elastic Stop nuts give built-in insurance against product failure —the kind of reliability that shows up in customer maintenance records and adds up to reorders. Let us send you information showing how manufacturers have protected the reputation of their products with Elastic Stop nuts. Ask for Bulletin 5901. Dept. 547 1160. Elastic Stop Nut Corporation of America, 2330 Vauxhall Road, Union, New Jersey.

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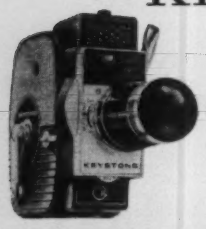
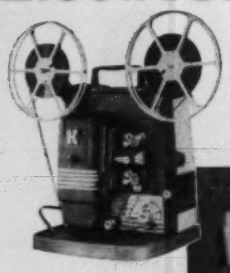
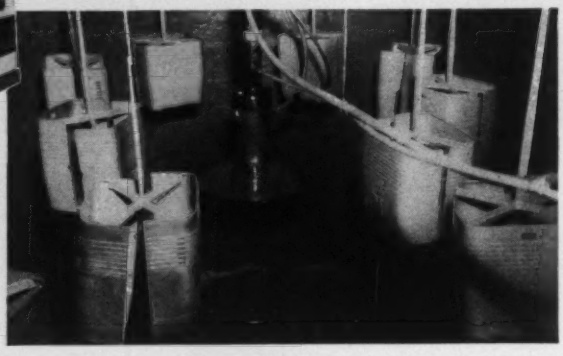
ELASTIC STOP NUT CORPORATION OF AMERICA

KEYSTONE CAMERA Relies on RANSBURG No. 2 Process Electrostatic Spray Painting





to get the high quality wrinkle finish on cameras and projectors



Projector covers rotate as the conveyor makes a loop around the ceiling-mounted Ransburg No. 2 Process reciprocating disk. Electro-Spray is providing large paint savings on this wrinkle application, and permits Keystone to meet increased production requirements.

Keystone Camera Company, Inc. adheres to a strict quality control program—from start to finish—in the production of their widely-distributed, high quality home movie products. That's one reason for using the Ransburg No. 2 Process to apply a uniform wrinkle finish on their cameras and projectors.

IMPROVED QUALITY AND LARGE PAINT SAVINGS TOO

Together with the improved quality and greater uniformity in their finish, Keystone reports large paint savings over former air hand spray. Rejects which used to run 7%, or more, are reduced to less than 1%. Too, Ransburg No. 2 Process has enabled their finishing department—often a bottleneck in production—to meet steadily increasing production requirements without resorting to expensive overtime. Now, with the automatic No. 2 Process, they can turn out more projector covers in an hour than one operator formerly painted in a day. And, assembled cameras are painted five times faster with Electro-Spray. As a result of these desirable advantages—coupled with even higher production schedules—another Ransburg No. 2 Process unit was authorized for a second, identical production line at Keystone.

NO REASON WHY YOU CAN'T DO IT, TOO

Let us show you how Ransburg No. 2 Process can improve the quality of YOUR painted products, and at the same time, cut YOUR paint and labor costs. Send for our No. 2 Process brochure. Or, if your production doesn't justify automatic painting, let us tell you about the No. 2 Process Electrostatic Hand Gun which can be used in either conveyorized or non-conveyorized painting.

RANSBURG

RANSBURG Electro-Coating Corp.

Box 23122, Indianapolis 23, Indiana

Chairman, W. V. Daugherty; president, T. R. Hughes; vice president, C. E. Wilderman; and secretary, H. T. Dorrance.

NEW OFFICES

I-T-E Circuit Breaker Co., Philadelphia, established two new district sales offices. An office at 1010 S.W. 14th St., Portland, Oreg., is managed by G. W. Geiger. An office at 910 Fifth Ave., Seattle, is managed by W. V. Knowles. The company makes electrical transmission and distribution equipment.

Armco Steel Corp., Middletown, Ohio, opened a sales office at 1834 Penbroke Rd., Greensboro, N. C. Sales representatives are J. D. Judd and R. K. Kingsbury.

Canfield Steel Co., Canfield, Ohio, opened an office at 5711 N. Lincoln Ave., Chicago, Ill. K. W. Burge is district sales manager. The company is a division of Life Time Products Corp., Los Angeles, and is a producer of electrogalvanized sheets and strip.

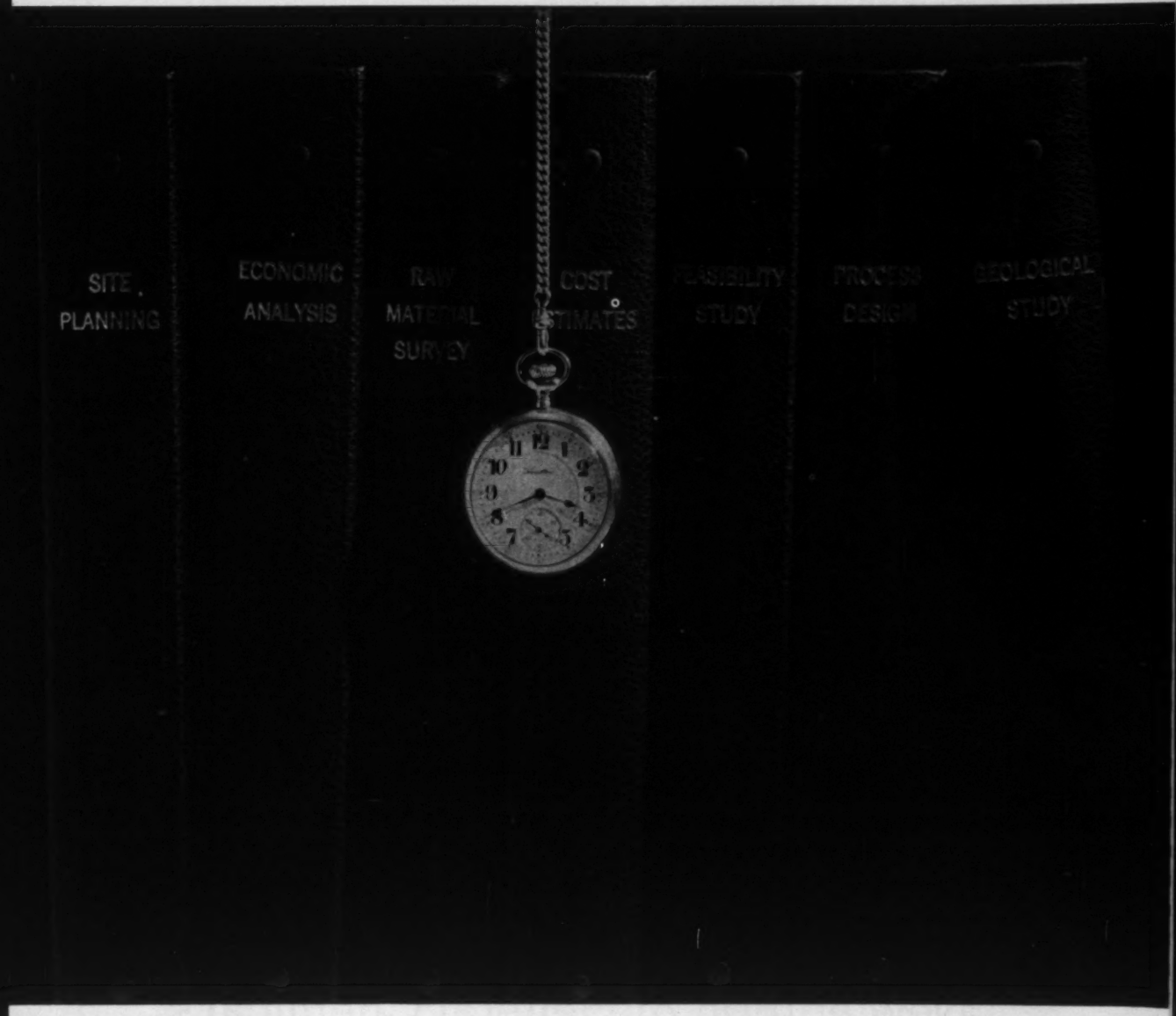
Posen & Kline Tube Co. Inc., Norristown, Pa., opened a branch office at 1900 W. Kinzie St., Chicago 22, Ill., under Scott Johnston, district sales manager. The company is a subsidiary of Handy & Harman, New York.

ASSOCIATIONS

Cast Bronze Bearing Institute, an affiliate of the Non-Ferrous Founders' Society, Evanston, Ill., elected these officers: President, C. N. Paden Jr., Moccasin Bushing Co., Chattanooga, Tenn.; vice president, A. G. Eberle, Renewal Service Inc., Philadelphia; and secretary-treasurer, R. O. Oyler, Bunting Brass & Bronze Co., Toledo, Ohio.

Non-Ferrous Founders' Society, Evanston, Ill., elected these officers: President, E. G. Brumund Jr., Brumund Foundry Inc., Chicago; first vice president, D. A. Mitchell, Progressive Brass Mfg. Co., Tulsa, Okla.; second vice president, L. J. Andres, Lawran Foundry Co., Mil-

Pre-Engineering by **KAISER ENGINEERS** answers basic plant expansion questions...



Timely? Many complex factors shape the final decision to proceed with your expansion plans...and timing is an important one. Independent analysis of all aspects of your proposed program is the *Pre-Engineering* service offered by Kaiser Engineers. The studies and evaluations furnished by KE Pre-Engineering represent only one phase of total KE services. Kaiser Engineers designs and builds for the Steel industry...offers skilled experience in all types of facilities from raw material plants to finishing mills. From Pre-Engineering through design and construction, Kaiser Engineers provides complete, one-company service and ingenuity based on years of experience.

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Write today for your free copy of this newly revised, important reference work.

New enthalpy curves . . . appearing for the first time . . . enable sulfuric users to calculate heat developed and final temperatures when acid is diluted with water.

Just Out!

New edition of General Chemical's valuable sulfuric acid data book!

Here is a revised edition of General's now-classic technical brochure on sulfuric acid—40 pages of charts, graphs and facts from America's foremost producer. This is a comprehensive technical manual with a wealth of data selected for its practical value to sulfuric acid users. Charts have been revised for easier reference, and up-to-the-minute information has been included on uses, manufacture, properties, storage, handling and methods of analysis. Booklet contains material not available from any other source.

If you use sulfuric acid, you cannot afford to be without this valuable reference work. For your free copy write General Chemical on your company letterhead.

Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N.Y.

waukee; executive secretary and secretary-treasurer, Herbert F. Scobie. Mrs. B. M. Stebbings continues as assistant secretary-treasurer.

National Lubricating Grease Institute, Kansas City, Mo., elected these officers: President, F. R. Hart, Standard Oil Co. of California, San Francisco; vice president, C. L. Johnson, Jesco Lubricants Co., Kansas City; secretary, T. F. Shaffer, Shell Oil Co., New York; and treasurer, A. J. Daniel, Battenfeld Grease & Oil Corp., Kansas City, Mo.

CONSOLIDATIONS

Aldridge Industrial Oils Inc. purchased **Middle States Oil Co.** and will operate it as a division. Both are Cleveland companies and both are manufacturers of lubricants and compounds used principally in the metalworking industry. Norman Giessen is general manager of the division; Warren Bower, assistant general manager.

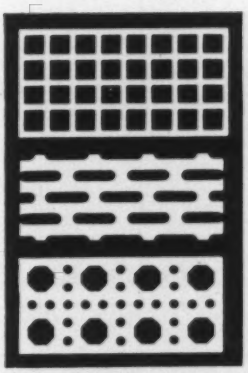
Concrete Plank Co. Inc., Jersey City, N. J., **Duffy Concrete Products Inc.**, Tenafly, N. J., and **Porete Mfg. Co.**, North Arlington, N. J., have merged under the name of Concrete Plank Co. Inc. The firms make precast concrete products for the building industry.

Mosher Steel Co., Houston, purchased **Campbell Steel Co.**, San Antonio and Corpus Christi, Tex., and will operate the property as a subsidiary. E. J. Mosher is president of Mosher Steel Co. and R. Trent Campbell is executive vice president of Mosher and president of the subsidiary.

Lewis & Kaufman Electronics Corp., Los Gatos, Calif., purchased **Cascade Research Corp.**, Los Angeles, manufacturer of microwave ferrite components.

James B. Clow & Sons Inc., Chicago, purchased **Streator Drain Tile Co.**, Streator, Ill., producer of vitrified clay sewer pipe, drain tile, and other clay products. Clow is a manufacturer of cast iron pressure pipe and two of its subsidiaries produce valves and fire hydrants.

(*Please turn to Page* 108)



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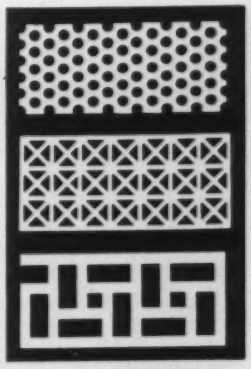
ANSWER
to
Many Production Problems



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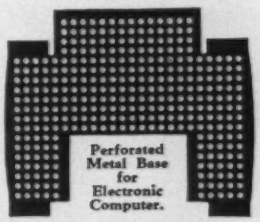
Sheets • Plates • Panels • Fabricated Parts

For nearly half a century we have supplied America's largest industrial organizations with perforated metal products of all kinds; in lots to meet their production schedules. This procedure not only reduces their inventory costs but, usually, also assures other substantial savings because of our special facilities for producing this type of work efficiently and economically.

Send us YOUR blue prints and specifications. Our experienced engineers are often able to make cost-cutting suggestions without charge or obligation.



We fabricate special panels or parts to any desired extent. Illustrated Catalog on request.

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LET UNIVERSAL SUPPLY AND GRIND IT

Eliminate double purchasing and re-handling bar stock for precision finished straight shafting. Universal's quote on stock and finish will delight you . . . and there's no delay.

Materials — Mild Steel, Alloys, Non-Ferrous.
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Ask for Universal's illustrated catalog file covering 14 grinding operations that can save you time and money.

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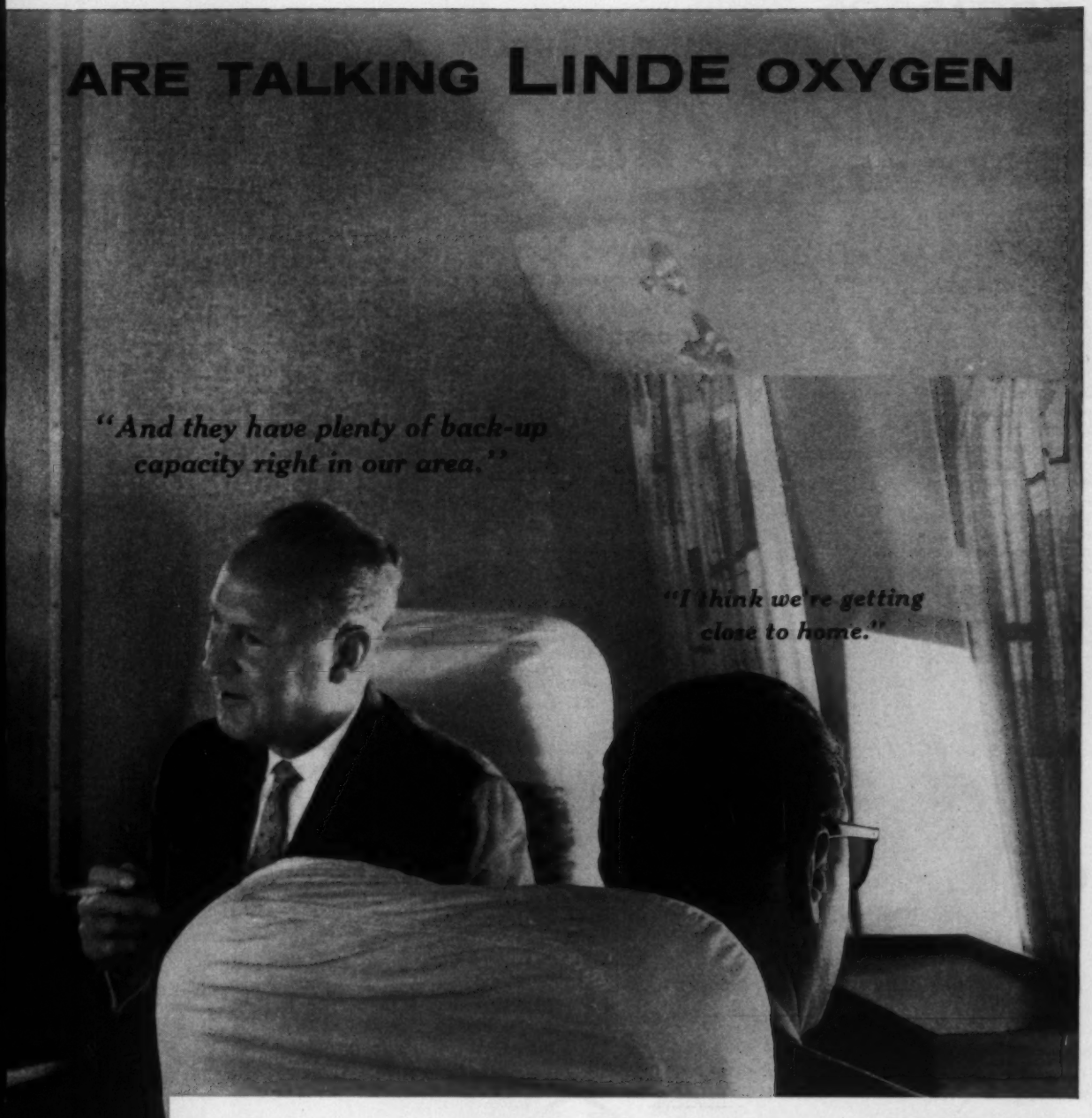
"I know that LINDE will bear the whole cost of building an on-site oxygen plant for us."
"...but we'll need more oxygen if we put roof jets in our open hearths."

ARE TALKING LINDE OXYGEN



You can learn what LINDE's *total gas technology* means to on-site plants for steelmakers by writing Linde Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. *In Canada*, Union Carbide Canada Limited, Linde Gases Division, Toronto 12.

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NEW! CHAMBERSBURG POWER/TROL

a power assist control system for operating single frame and double frame forging hammers

NOW, on Chambersburg Single Frame or Double Frame Flat Die Forging Hammers, of 2500 lbs. (falling weight) or larger, the new POWER/TROL transfers operation of the hammer from the large, heavy, awkward lever controls located on the hammer frame, to two power-assisted, hand-operated controls mounted on a console which can be placed anywhere within 20 feet of the hammer, free from overhead hazards, intense heat, flying scale, etc. The hammerman's job is easier and safer than ever before, and forging is faster.

POWER/TROL to upgrade existing Chambersburg flat die hammers costs less than $3500.00!

ADVANTAGES:

- **the hammerman is at a safe location, convenient to his crew**
- **hammer operation is practically effortless**
- **blow sensitivity is retained**
- **more forging can be accomplished each heat**

Write today for a copy of Bulletin 99-L-O

CHAMBERSBURG ENGINEERING COMPANY • CHAMBERSBURG, PA.

CHAMBERSBURG

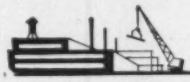
• The Hammer Builders •

DESIGNERS AND MANUFACTURERS OF THE IMPACTER

When it's a vital part, design it to be FORGED

(*Concluded from Page* 105)

Mathews Conveyer Co., Ellwood City, Pa., purchased Tobert Co., Lansing, Mich., manufacturer of oscillating conveyors. Manufacturing operations will be moved to the Ellwood City plant.



NEW PLANTS

E. J. Lavino & Co., Philadelphia, is producing high purity, refractory grade periclase in its new plant at Freeport, Tex. The shaft kiln production method is used.

Atlas Engineering Co. Inc. is constructing a plant at 10 Cheney St., Roxbury, Mass., with completion scheduled for February, 1961. The transformer manufacturing facility will contain 36,000 sq ft of floor space.

Pfaudler Co., a division of Pfaudler Permutit Inc., Rochester, N. Y., plans to build a $750,000 Research & Development Center at Henrietta, N. Y. The company produces glassed-steel equipment and does research with refractory metals.

Jefferson Chemical Co. Inc., Houston, opened its plant in Conroe, Tex.

NEW ADDRESSES

Colorado Fuel & Iron Corp., Denver, transferred its Buffalo Purchasing Department to 640 S. Broad St., Trenton, N. J. Purchasing for the offices and plants within the Eastern Div., Wickwire and Roebling, is under the supervision of A. R. Kinney, director of purchases, and K. S. Dickel.

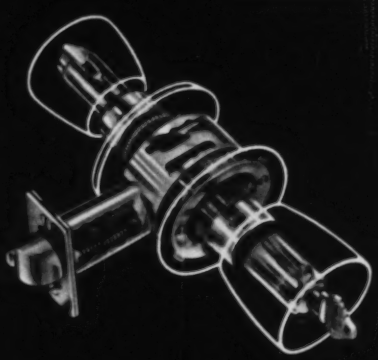
Purchasing Department of **Hercules Powder Co.'s** Bacchus, Utah, plant moved to 320 S. Main St., Salt Lake City, Utah. The mailing address continues to be Hercules Powder Co., Magna, Utah. J. E. Greer is works manager; R. A. Sawyer, purchasing supervisor.

U. S. Steel Supply Div. moved its district office to 13535 S. Torrence Ave., Chicago, Ill. W. J. Borwick is the district manager.

Extra years of fine lock service

-thanks to Superior Stainless

STRIP STEEL



Inside Schlage's all stainless lock: easy working for a lifetime with Superior Stainless non-corrodible knobs, rose and internal mechanism.

The finest lock of its kind in the world, this pride of the Schlage Lock Company is built entirely of stainless steel—outside and in. Designed for institutional, commercial and marine use, it will deliver many years of faithful service undimmed by corrosion, tarnish, chipping or peeling because it's *solid* Superior Stainless . . . the stay-bright, easy-to-fabricate metal for your toughest applications. • Find out how Superior Stainless Strip Steel can better your present products and the ones to come. Consult a Superior sales engineer for facts you can use right now!

SUPERIOR STEEL DIVISION
OF
COPPERWELD STEEL COMPANY
CARNEGIE, PENNSYLVANIA
For Export: Copperweld Steel International Company, New York

Stainless Steel

Steel Warehouse Handles 3500 Stock Items with "TRAK-RAK" Crane ——— *Reduces Operating Costs...Speeds Service*

1. "TRAK-RAK" Crane moving into aisle between double rows of racks. Racks are 20 ft. high. Distance from floor to underside of roof truss is 30 ft. Aisle width is 5 ft.-4 in.

Edgcomb Steel of New England, Inc. warehouses 3500 different items of steel, stainless steel, brass, and aluminum bar stock in an area 60 feet wide, 27 feet high, and 160 feet long.

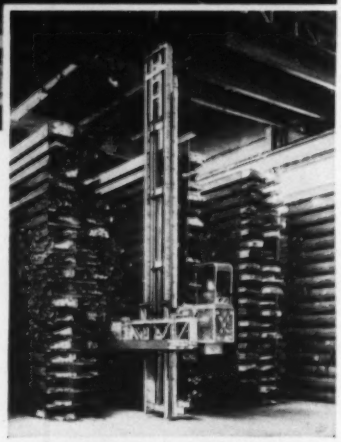
ONE man and a "TRAK-RAK" Crane serve the five double rows and two single rows of "Christmas Tree" racks which hold 2700 storage trays. Edgcomb processes approximately 2500 to 3000 orders per month, and the company reports very favorable reductions in operating costs and faster order processing and delivery.

Edgcomb's "TRAK-RAK" Crane has a traveling bridge (Photo 1) which spans the storage bay, and an overhead trolley from which is suspended an electrically operated rotating column equipped with a carriage for handling the storage trays. All operations of the crane and carriage, which rotates, moves toward or away from the racks, and raises or lowers on the column, are controlled by the operator who rides with the carriage. Safety switches prevent the column from running into a rack and permit full rotation only when the unit is safely beyond the end of the racks.

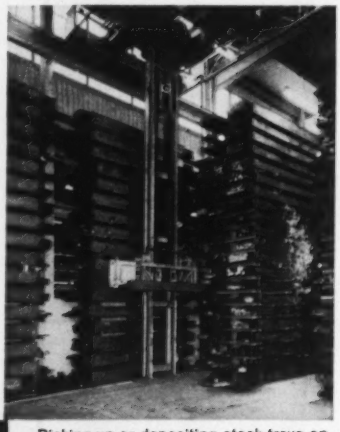
Hundreds of "TRAK-RAK" installations, designed to meet the user's particular requirements are in use today. They are handling many types of material and loads with great speed and economy. Specific advantages the "TRAK-RAK" System of vertical storage and handling brings to the user are:

1. **Maximum utilization of the cube to permit storing and handling more material in less floor area.**
2. **Faster material movement in and out of storage.**
3. **Reduction in personnel and lower labor costs.**
4. **Improved safety, better housekeeping, precise inventory control.**

Take the first step toward faster, more efficient material storage and handling now. Write for complete details on "TRAK-RAK." Chicago Tramrail Engineers are available to discuss your handling problem with you at any time—and at no obligation to you.



Crane with operator, who rides with carriage, emerging from aisle with loaded stock tray.



Picking up or depositing stock trays on the rack is a fast, safe operation. Trays and rack sections are color coded for quick location and identification.

CHICAGO TRAMRAIL CORPORATION
1326 SOUTH KOSTNER AVENUE • CHICAGO 23, ILLINOIS

Specialists in the design, manufacture and installation of material handling systems for steel warehouses and other industries

Technical Outlook

LENGTH REDEFINED—A new international standard for the meter has been adopted—1,650,763.73 wave lengths of the orange-red line of krypton 86 replaces the platinum-iridium meter bar which has been kept at Paris as an international standard since 1889 under the Treaty of the Meter. Duplicates of the old standard were subject to error. The wave length is a constant.

ALLOY'S SUPERIORITY PROVED—Laboratory and field tests have confirmed earlier findings of the excellent corrosion resistance of titanium-0.2 per cent palladium alloy in reducing type environments. At Argonne National Laboratory, Lemont, Ill., commercial titanium samples had to be removed from boiling sulfuric acid after 85 hours while the alloy samples were going strong after 170 days. At Columbia-Southern Chemical Corp., Barberton, Ohio, the alloy survived calcium chloride solutions unscathed while commercial titanium pitted to failure.

TWO FOR ONE COATING—A new, color coating process for metals called Hinac is ready for production, says Pennsalt Chemicals Corp., Philadelphia. First developed by Heintz Div., Kelsey-Hayes Corp., Philadelphia, it combines resins and a chromate treatment. After application in a water solution, the coating is baked. The finish weathers well. It can be applied to most metals.

REFRACTORY PROTECTION—Tungsten covered by alternate layers of chromium, silicon, and rhodium withstands 3000° F for 20 minutes, states an Air Force metallurgical study. The coating works even better if it is diffusion alloyed completely and its surface is bonded and melted.

WELDING IN RUSSIA—The Soviets are prefabricating storage tanks up to 50 ft in diameter, then rolling them up for transportation to the site. The rolls are pulled apart by tractor, and the installations are completed with minimum field welding, reports the British Welding Research Association. (A group from the association attended a welding show in Moscow and visited five technical schools.) Another observation: Function is considered secondary to appearance. For example, puckering on the face of sheet materials (caused by the welding of studs) is accepted in the manufacture of car bodies. The British group also thinks that the Russians are putting more emphasis on the application of new welding processes and associated problems than they are on fundamental work for the sake of increasing knowledge.

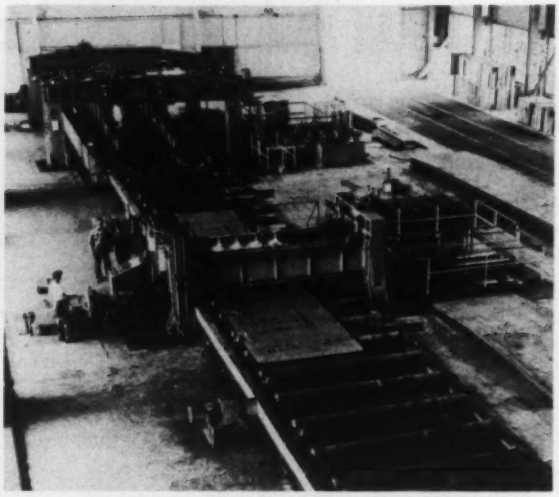
BOOM FOR FERRITES?—An experimental device which warns motorists when they're too close to either side of their highway lane is being tested at the General Motors Proving Grounds, Milford, Mich. A buried wire in the lane center radiates low frequency power. Ferrite cores on either side of the front bumper pick up signals which vary in strength with the distance from the wire. Test results are expected to lead to new approaches in designing automatic autos.

SMOOTHING CUTTING—Cutting of steel with fuel-oxygen torches can be speeded greatly by employing the right kind of torches and controls, states C. C. Anthes, project engineer, Linde Co., Newark, N. J., a division of Union Carbide Corp. At a recent meeting of the American Welding Society, he said: Under proper conditions, pierce starts can be made in less than 5 seconds. Some current methods, he added, require more than a minute.

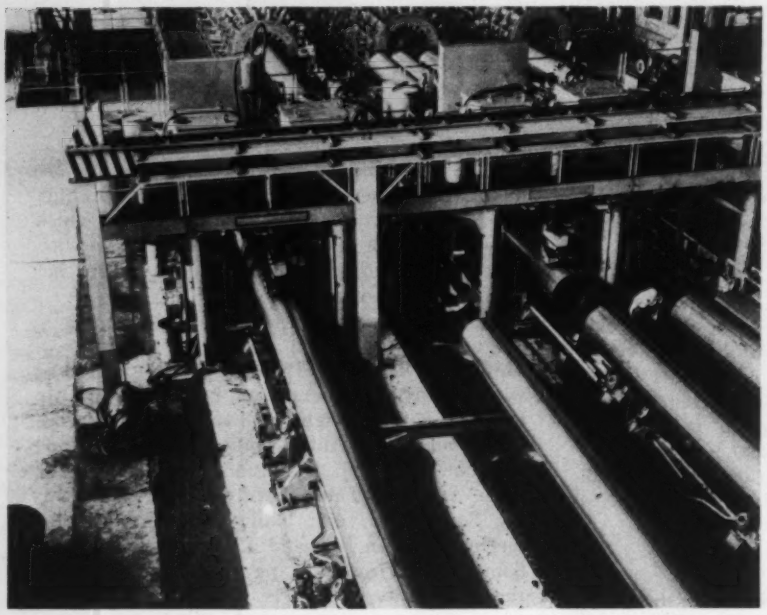
STATIONARY JET POWER—The J-57 engine (Pratt & Whitney) that powers most Boeing and Douglas jet airliners is about ready for a new role—this time on the ground. It'll power a turbine (developed by Cooper-Bessemer Corp.) at Columbia Gulf Transmission Co.'s compressor station, Clementsville, Ky. The 10,500 hp unit will burn natural gas as it pushes natural gas through Columbia's transmission lines. The fully automatic station will be unattended.

New Line Boosting Pipe Plant Output

Mill capacity is expected to triple, thanks to machines that plane, form, weld, expand, and test 40 ft pipeline sections



1. **PLANER** takes up to ½ in. of material from each side of the plate. A second unit trims ends and cuts plates to size



4. **WELDERS** join the edges of the plate with one seam inside, another outside; submerged arc units leave a continuous deposit at 50 to 75 in. a minute

PRODUCTION of high strength, large diameter steel pipe—for cross-country transmission of high pressure natural gas—may be tripled at the Steelton (Pa.) plant of Bethlehem Steel Co., by a new mill.

The line is said to be capable of turning out 25,000 tons of pipe a month. The 40 ft lengths are 18 to 42 in. OD. Previously, the pipe was made by rolling 20 ft lengths of steel plate into cylinders. They were buttwelded to form standard 40 ft lengths.

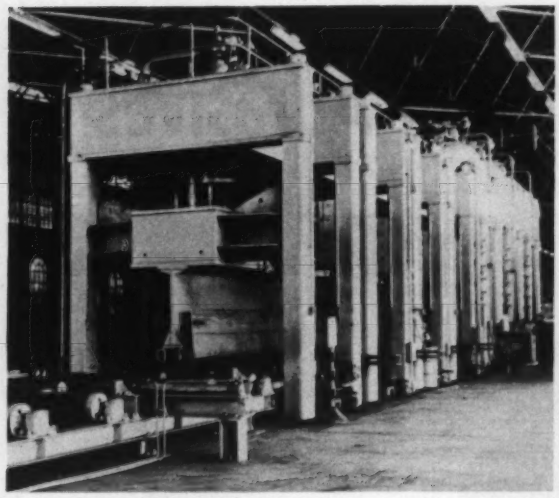
• An automatic feeder moves plates from the receiving table to side and end planers, which remove excess material.

Steel stock from the company's Johnstown (Pa.) or Sparrows Point (Md.) plants is oversize when it arrives at Steelton to allow for dimensional losses on the 1000 ft production line. The plates are 40 ft 5 in. long, and 52 to 130 in. wide, depending on finished pipe diameter.

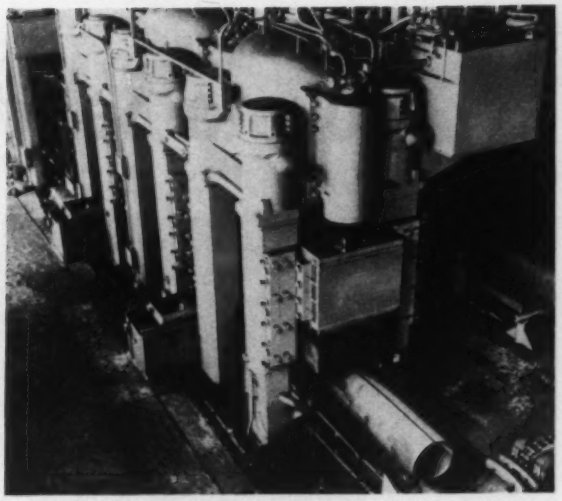
Plates are stacked on a receiving table and moved, one at a time, to a feeding table. Then they pass through a planer that removes up to ½ in. of stock from each side. Another planer, which uses photoelectric cells for automatic plate positioning and hydraulic devices for squaring, trims leading and trailing ends.

• One big press forces plates into a "U" shape, another closes them to form "O" sections.

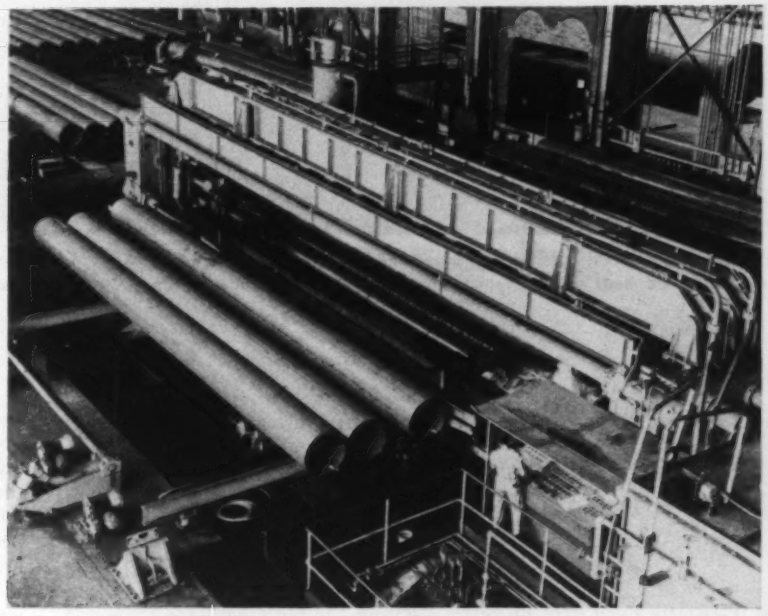
Each plate is positioned precisely (by limit switches) in a 2500 ton,



2. U-ING PRESS does the first forming operation; A male punch presses downward, and the rocker die tilts upward on each side



3. O-ING PRESS forces plates into cylindrical shape. A key in the upper die keeps plates from twisting as the dies come together



5. EXPANDER forces water into pipe sections at 5700 psi, increasing circumference of the pipe, shortening it, and testing for bursting strength and leakage

hydraulic press. A male punch presses downward in the center of the plate, and the rocker die (under the plate) tilts upward on each side. The plate is formed into a long "U" section in about 1 minute.

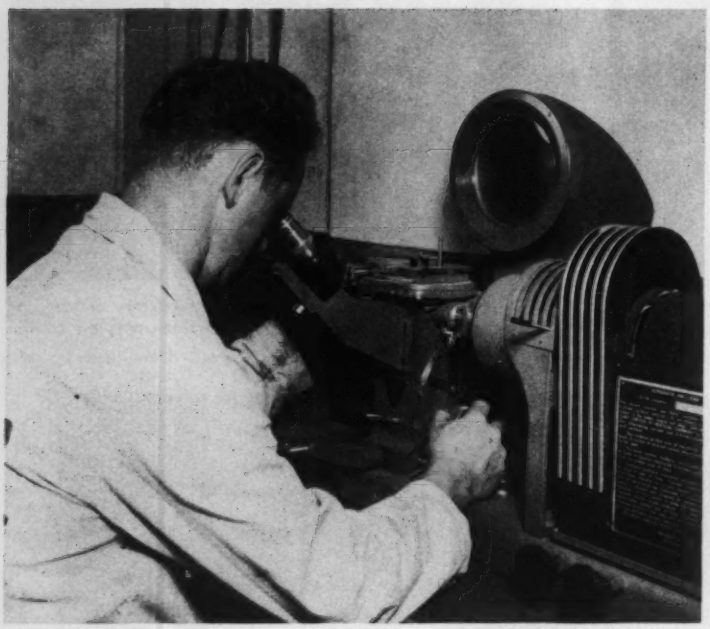
The "U" section is moved into an 18,000 ton press, positioned by photoelectric cells, and forced into an "O" section, with a 1 in. gap running along the top. A key that runs the length of the upper die prevents the plate from spiraling as the dies come together. The same operator controls both forming presses.

• Electricwelders close the pipe seams. Then the pipe is expanded by water presure and tested.

Each formed plate is fed into one of three inside seam welders, which join the two plate faces in an operation that resembles the closing of a zipper. The pipe is rotated, so the gap is on the underside. A tandem, submerged arc, welding unit puts a continuous bead on the steel at 50 to 75 in. per minute. Rotary rolls prevent cracking while the weld metal cools. The pipe then goes through one of three outside seam welders, seam up.

Pipe sections are visually inspected, then put into a 5700 psi, water pressure expander, which increases pipe circumference, shortens the pipe, and gives it greater yield strength. The pipe is tested for bursting strength and leakage, inspected fluoroscopically for weld flaws, and given a final visual inspection.

How to Select Steel Abrasives



Check microstructure. It should be a refined, tempered martensite. A properly controlled heat treat, quench, and draw are important

Breakdown test: Rapid breakdown has an adverse effect on cleaning speed

A good steel abrasive costs more but cleans rapidly and effectively, lasts longer, and is easier on blast cleaning equipment. Here are six guides

SELECTING the right steel abrasive can be one of the most important factors in determining the cost and effectiveness of your blast cleaning, shot peening, or descaling operation.

Here are six guideposts set up by J. R. McConnell, manager, Roto-blast Abrasives Div., Pangborn Corp., Hagerstown, Md.

1. Select either shot or grit, depending on the work and finish desired.

2. Use the smallest size abrasive consistent with the work to be done.

3. Choose the abrasive which provides the highest percentage of pellets in the ideal hardness range.

4. Make sure the microstructure is a refined tempered martensite.

5. Pick out an abrasive made of low phosphorous, low sulfur steel with a good measure of manganese for toughness and the right amount of carbon.

6. Get an abrasive that's as free of voids and hollows as possible.

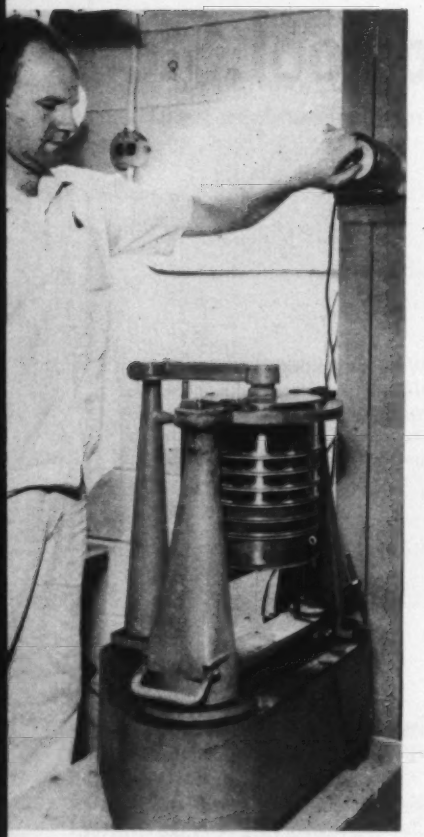
• Steel abrasives (usually found above 43 or 44 Rc hardness) score on three points: 1. Rapid and effective cleaning. 2. Long life. 3. Low wear on blast cleaning equipment.

The material is hard enough to clean rapidly and effectively, tough enough to avoid rapid fracture and breakdown into fines (which cause high machinery wear), and is in the ideal hardness range to have long life. To get the higher initial per pound cost and come out with lower total cost, check your system to make sure abrasive isn't being wasted through leakage, excessive carryout, or faulty adjustment of abrasive separation.

• Where surface scale must be broken, shot (acting like tiny hammers) usually does a better job.

Some materials, however, are better cleaned with grit (which acts like tiny chisels). Grit is also useful for such things as bonding coatings. Experience can help determine choice of shot, grit, or a combination.

• Picking the right abrasive size takes two steps: 1. Determining how large pellets must be to do the job. 2. Using the smallest size possible



The right size? A lab analysis checks out production screening

and economical cleaning.

As abrasive is propelled to the work, it becomes smaller because of fracture or wear. The change is not uniform. To keep the mixture in balance for an efficient job, add small amounts of new abrasive periodically. The larger particles loosen the sand or scale, and the smaller pellets provide rapid removal. Another benefit: A properly proportioned mix lasts longer.

• Ideal hardness is usually considered to be 43 to 46 Rc.

The more a pellet deviates, the less value it has for blast cleaning. Generally, an abrasive that is too hard cleans well, but breaks down too fast; an abrasive that is too soft doesn't clean well and doesn't last as long as one in the ideal hardness range. Special applications sometimes require pellets with higher hardness. Two additional types (one averaging 50-55 Rc, the other 60-63 Rc) are available for jobs such as steel mill roll etching and blasting hot water tanks prior to glass lining.

• Microstructure should be a refined, tempered martensite.

Generally, the maximum toughness in steel shot is gained by heat treating the material, quenching it, then subjecting it to a draw or low temperature heat treat.

• Phosphorus and sulfur in excessive amounts are detrimental to steel shot life.

Low phosphorous, low sulfur steel with a minimum manganese content of 0.80 for toughness and a carbon content of 1.00 to 1.20 give the longest wear life.

• A solid, dense particle offers the longest wear life.

Some specifications cover this by establishing a density. For example, one states that a cast steel abrasive should not be less than 7.00 grams per cc. Hollow shells shatter on impact and offer little cleaning value.

under that requirement.

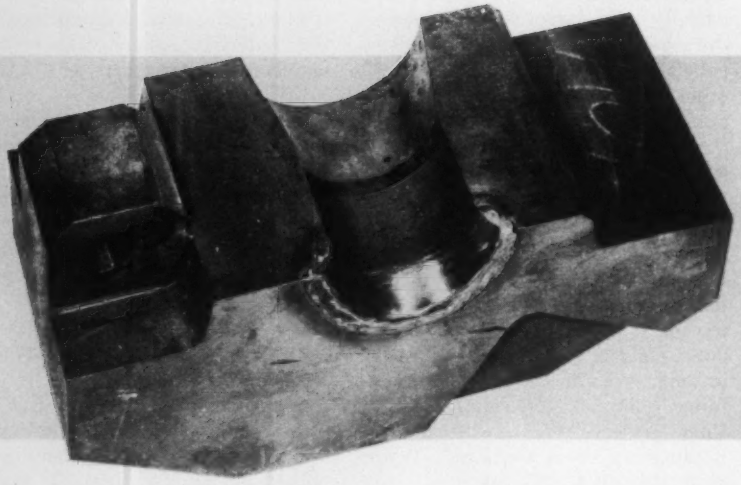
The reasoning goes something like this: If a "hammer" of a certain size will clean work effectively, one of larger size won't do it significantly better. Improvement in overall efficiency is principally a matter of hitting your work with more "hammers" per unit of time.

Example: A blast cleaning unit throws "X" pound per minute per horsepower. A pound of S-550 shot has about 23,600 hammers, while a pound of S-330 has about 114,800. If S-330 will clean your work, the increased number if impacts should clean better and cut your abrasive costs significantly. Not only are there more pellets per pound in smaller sizes, but tests show that the rate of breakdown is slower than it is in the larger sizes.

• Small, regular additions of new abrasive keep the operating mix in proper balance for rapid, effective,

Make small, regular additions of abrasive to keep the operating mix in proper balance. (Violation of the rule is common and costly)

How to Weld Graphitic Tool Steel



Worn or damaged dies are frequently repaired with arcwelding. This illustrates how deposits are built up in machined grooves, then finished to size

By C. A. PFOUTS
Tool Steel Metallurgist

C. F. JATCZAK
Research Metallurgist
Timken Roller Bearing Co.
Canton, Ohio

THE WELDABILITY of graphitic tool steels, a major factor in their selection, offers three advantages to the user:

1. Tool design may be changed frequently.
2. Assembly and heat treatment errors can be rectified quickly.
3. Worn and broken dies made of weldable tool steel are easier to repair than other types.

• Graphitic tool steels are alloys containing precipitated graphite and carbides throughout.

Graphite contributes to machinability. We also believe such steels have top rate nongalling and wearing characteristics as well as good vibration damping properties. In practice, they appear to be less prone to quench cracking from heat treatment. The tiny graphite pockets also help relieve the high thermal and transformation stresses that are generated.

• Such steels can be welded in both the annealed and hardened condition. Seven factors must be considered:

1. Type of steel and its microstructure.
2. Hardness, microstructure, and application of weldment.
3. Electrode selection.
4. Surface preparation.
5. Preheating.
6. Welding procedure.
7. Stress relief (peening or postheating).

The kind of steel you select and its heat treated condition are the most important of those factors. They largely determine what the welding electrode material is to be and the preheat and postheat treatment of the welded tool. For example, annealed WW (Graph-Tung) can be easily welded, but it works out better if the steel is hardened and tempered.

• Select welding electrodes to match the tool steel.

Welds on the working surfaces of tools made of graphitic steels should be laid down with: Oil hardening tool steel electrode material (we use Eureka 71M made by Welding Equipment & Supply Co., Detroit); an air hardening tool steel electrode (Eureka T.G.A.); or an oil or water hardening rod (like Eureka 70W). Such rods have a common metallurgical characteristic—a low hardening range which matches the hardening temperatures of graphitic tool steels.

Deposits of electrodes like the Eureka do not contain graphite in the microstructure. Like conventional nongraphitic tool steels, such deposits are more susceptible to stress cracking, grind checking, and burning than the base material. But laboratory tests show that stresses in weld deposits on graphite type steels are much lower than those on conventional steels. (Graphite pockets in the base metal have a stress relieving action.) We also recommend further stress relieving measures (mechanical peening, preheating, and postheating).

For simple tie-down, tool anchoring, or spotting, regular commercial ferritic (low carbon) or higher strength austenitic rods may be employed. For fill in of deep holes or craters without peening, use only the ferritic types. Solid plugs welded with plain ferritic rods (Type E10015) are acceptable.

• The five steps of this welding procedure will minimize cracking.

1. In partial repairs, the crack must be completely removed, otherwise subsequent heating will cause further cracking. Metal removal should be enough to allow at least a $\frac{1}{8}$ in. deep, finished weld deposit.

To repair edge or corner defects,

Heat treatment, microstructure, welding rod composition, and surface preparation affect repair quality. The authors give basic rules, recommend materials

Recommendations for Welding Graphitic Tool Steels

TYPE	ANNEALED	HARDENED & TEMPERED
WW (Graph-Tung)	Avoid welding. If necessary, use Eureka 70-W	Eureka 70-W
OL (Graph-Mo)	Eureka 71-M	Eureka 71-M
(Graph-Air)	Eureka T.G.A.	Eureka T.G.A. or 71-M

*Note: All preheat and postheating temperatures should be between 300 and 400° F.

Typical microstructure on hardened and tempered graphitic steels after welding (above) . . .

. . . and after 400° F postheat. Top section is weld, center fusion zone, bottom base metal

grind a step or small shelf rather than a smooth angle. Allow a minimum of 3/16 in. finished weld for an angle type fracture cleanup. Over large areas, be sure finished overlays are at least 1/8 in. deep. Fracture or cracked units should be V'd to about one-third the thickness of the unit on opposing sides.

2. Select the correct electrode—always the smallest one possible because less heat is required to make a weld. Smaller electrodes mean more passes and better control of interpass temperature, lower welding stresses, less grinding, fewer sear marks, craters, and damage through overtempering.

3. Preheat all units to 300-400° F. Don't let interpass temperatures get above 400° F unless the final temper is to be higher; otherwise, the base metal softens. Preheating stretches the base metal before welding, slows down cooling afterward, reduces cooling stresses distortion, and the danger of weld cracking.

4. Welding must be completed before the preheated die unit is allowed to cool.

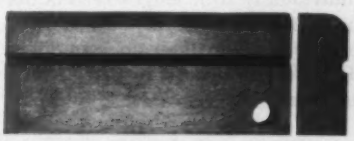
For cutting edges, position the work so that the deposit will flow or roll over the sharp edge. In welding deeply damaged edges or drawing and forming surfaces, fill up the damaged area from bottom to top, using slightly higher amperage on the first few beads. The edges of draw rings and similar circular parts should be built up with skipweld methods to insure even distribution of heat.

In depositing beads, work slightly upward. Gravity will roll back the deposit evenly, keeping the slag on top to minimize decarburization and oxidation. Deposit weld metal in 3 in. increments. That permits better control of interpass temperature and allows for peening at the optimum temperature (1000 to 1300° F).

To fill in large openings, it is good practice to plug the hole with a rod or bar. It should extend from the opposite side to within 1/4 in. of the working surface. Two layers of a ferritic (E10015) rod are laid, followed by a finishing bead of the appropriate hard electrode material. Austenitic rods aren't recommended.

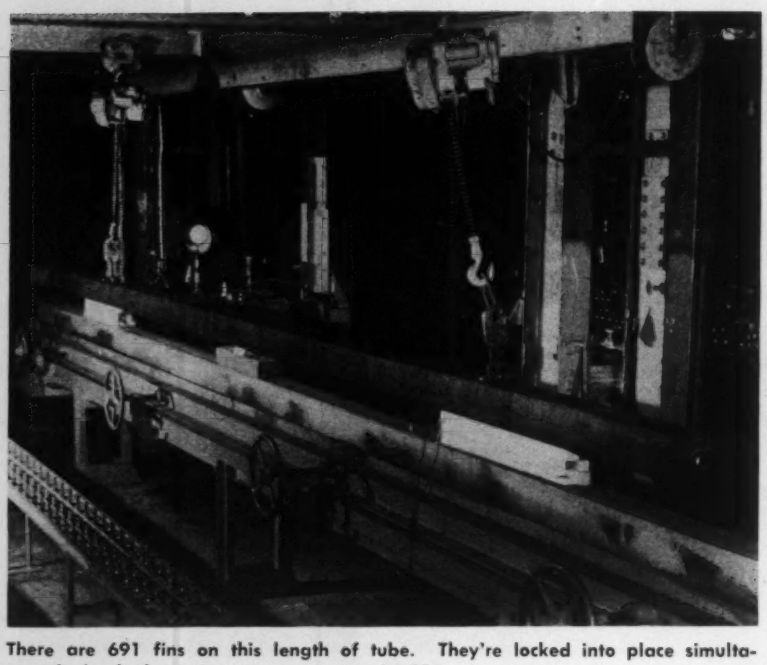
5. After welding, let the unit cool to room temperature before postheat treatment, which is required on all welds of graphitic steels to minimize grind checking.

Such procedures will produce evenly diffused and crackfree welds on all graphitic tool steels. The deposits won't check during normal grinding and can be used immediately afterward.



This tool steel test bar has been prepared to simulate weld preparation for a cracked surface, a blanking edge, and a hole buildup. Then . . .

. . . after welding and finish machining, the specimen looks like this, is just as hard as the original. (Section at right is through plug-welded hole.)



There are 691 fins on this length of tube. They're locked into place simultaneously by hydrostatic pressure—up to 24,000 psi

Pump Locks Fins on Tube

Hydraulic pressure expands outside diameter 0.005 in. to complete speedy assembly of heat transfer elements. Fabricator formerly had to shrink fins into place individually

NO LONGER does a large metal fabricator have to fasten 691 fins individually to a length of tube for heat transfer elements used in economizer sections of steam generators. They're now locked in place simultaneously.

It's done by expanding the outside diameter of the tube 0.005 in. Hydraulic pressure is provided by a compact, hydropneumatic pump made by Aldrich Pump Co., Allentown, Pa.

• The fabricator now follows five steps to complete assembly.

Fins are positioned about ½ in. apart in a notched assembly fixture.

The tube is threaded through the fins and the assembly fixture side-locked to hold the fins in place.

The top of the assembly fixture is placed on the fins for end seals and expansion pressures.

End seals are locked to each end of the tube with hydrojacks.

The assembly is then filled with water.

• The pump provides accurate pressure, minimum buildup time.

Operating at an air line pressure of 80 psi, the pump exerts an initial pressure of 4000 psi to hold the end seals. Pressure is then increased to 24,000 psi to expand the tube the necessary 0.005 in. That "freezes" the fins into position.

• The trick in assembly was to get a tight fit between the fins and outside of the tube.

Before the new technique was developed, heated cast rings with collars attached were positioned on the tube and shrunk into place with cold water. That meant fastening each fin individually.

The tubes are SA-210 carbon seamless, 2¼ in. OD and 29 ft 1⅜ in. long. Each of the fins is ⅛ in. thick by 6 in. square.

Metal, Graphite Bonded by Powder Metallurgy Method

Bearings, electrical and high temperature service applications are seen as possible uses for combinations of metal and graphite (they range from 40 to 90 per cent graphite by volume) prepared by a powder metallurgy process patented by Ford Motor Co.

Conventional powder metallurgy processes are used in the production of the unusual combinations. (Under most conditions, graphite is not wet by metals, does not bond to them.) The powder components are blended, cold pressed into compacts, and heated for sintering. During the sintering operation, the metal liquefies.

Earlier attempts to combine metals with graphite gave parts with poor strength. They were also extremely brittle, since the metal and graphite did not bond well. When heated to a temperature sufficient to melt the metal, separation of the two phases often occurred.

A material combining the desired properties of iron and graphite is produced by the addition of a powdered calcium-silicon alloy during liquid phase sintering. Without the alloy addition, products have poor strength, are brittle. Graphite-rich compositions, such as might be used for dry bearings, are reported to have higher mechanical properties than pure graphite, can be made to close dimensional tolerances. Metal rich compositions have properties similar to those of porous metal used in bearings with external lubrication, and have shown satisfactory performance over a wider range.

Similar combinations of graphite have been made with nickel, cobalt, copper, silver, and aluminum.

The combinations have been prepared by the Applied Science Dept., Scientific Laboratory, Ford Motor Co., Dearborn, Mich. They were described by Dr. Michael Humenik Jr., during a powder metallurgy seminar sponsored by the AIME at the National Metal Congress in Philadelphia.

The process was developed in a research program conducted by Dr. Humenik working with D. W. Hall and R. L. Van Alsten, also of the Applied Science Dept.

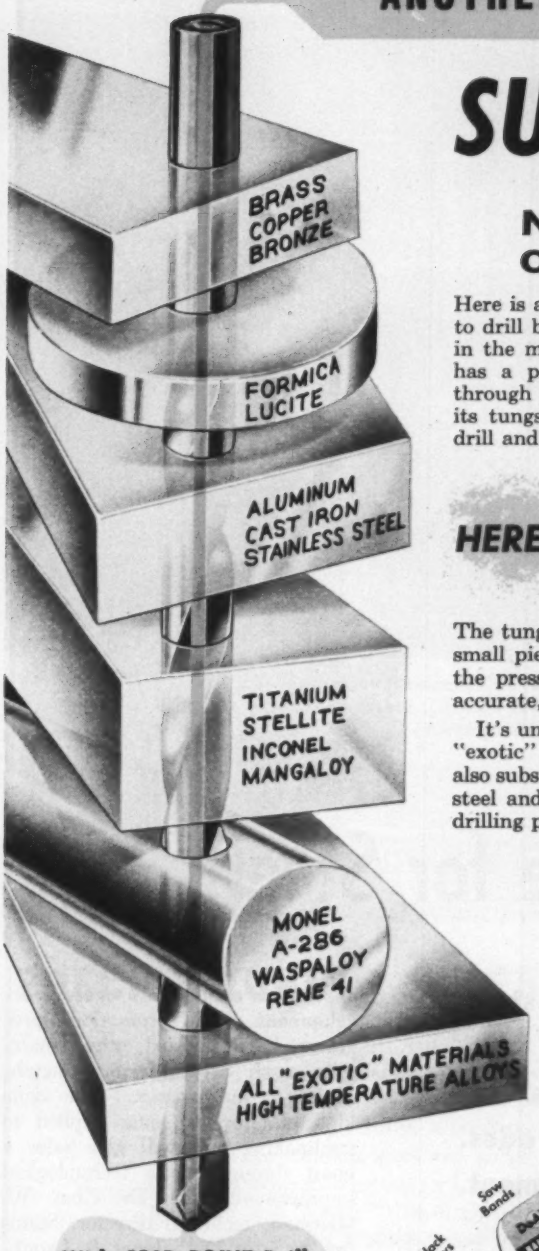
ANOTHER EXCLUSIVE from DoALL

SUPER DRILLING

with

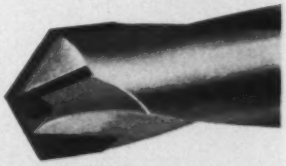
New COLD-POINT* Drill

Carbide Tipped • Patented



Here is a revolutionary new drilling concept that will enable you to drill blind, deep and through holes faster and more accurately in the most difficult of materials. The new *COLD-POINT Drill* has a patented internal cooling facility that delivers coolant through the drill, ejecting it under high pressure at the point of its tungsten carbide tip. Heat is carried away so fast that the drill and workpiece seldom reach temperatures above 100 deg. F.

HERE'S THE POINT . . .



The tungsten carbide tip has a negative rake to break chips into small pieces. These are quickly flushed up through the flutes by the pressurized coolant. Results: faster drilling; no withdrawal; accurate, superfine finished holes that often eliminate reaming.

It's unequaled in hard, tough, abrasive materials, including the "exotic" high-temperature alloys. The *COLD-POINT Drill* will also substantially increase production on aluminum, brass, stainless steel and many other materials which do not present as great a drilling problem as high-temperature alloys.

AVAILABLE IN 3 LENGTHS

COLD-POINT Drills are available through your nearby DoALL Sales-Service Store. Over 200 standard sizes, ⅛"-¾", and letter sizes A-Z, in Jobbers, Stub and Taper Lengths. Special lengths, diameters and internal threaded shanks can be furnished promptly. Also available: h.s.s. and DoALLoy† (cast alloy) tips. Prices on application.

Start cutting your drilling costs with DoALL *COLD-POINT Drills*. We invite you to try these sensational drills on your own work. Call your local DoALL Store today.

With COLD-POINT Drills

you get increased productivity at lower cost on your . . .

Screw Machines
Chucking Machines
Drilling Machines
Turret Lathes

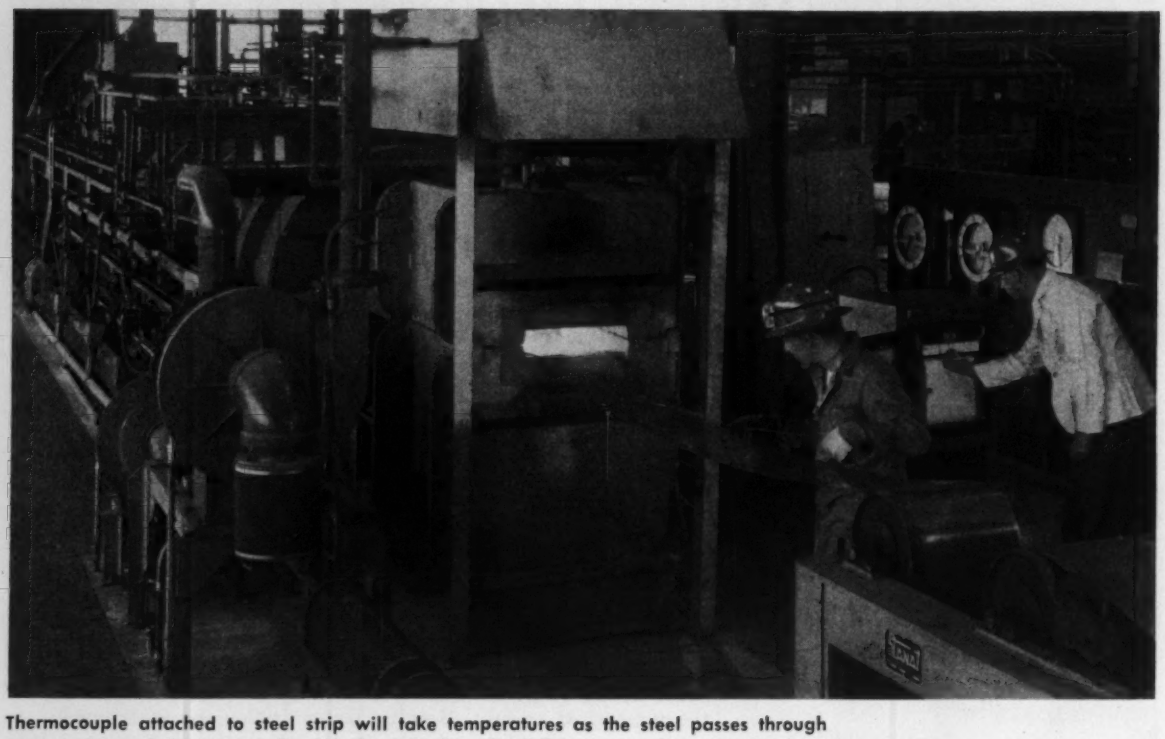
COLD-POINT Drills can be used on any machine with hollow spindle. Any other machine can be easily adapted with a coolant-fed chuck.

*Reg. T.M.—Mossberg U.S. Patent No. 2,871,983

CT-64

†Reg. T.M.—The DoALL Company

THE DoALL COMPANY • DES PLAINES, ILLINOIS



Thermocouple attached to steel strip will take temperatures as the steel passes through an experimental furnace at the Allegheny Ludlum Steel Corp. research center, Brackenridge, Pa. Charts from recorders (right) permit later study of furnace conditions

What's in the Future for Steel?

- **More progress in high strength steels.**
- **Better fabrication properties.**
- **More air hardening tool steels.**
- **Higher strength in stainless grades.**
- **Increased use of vacuum equipment.**
- **Wider use of automatic controls.**

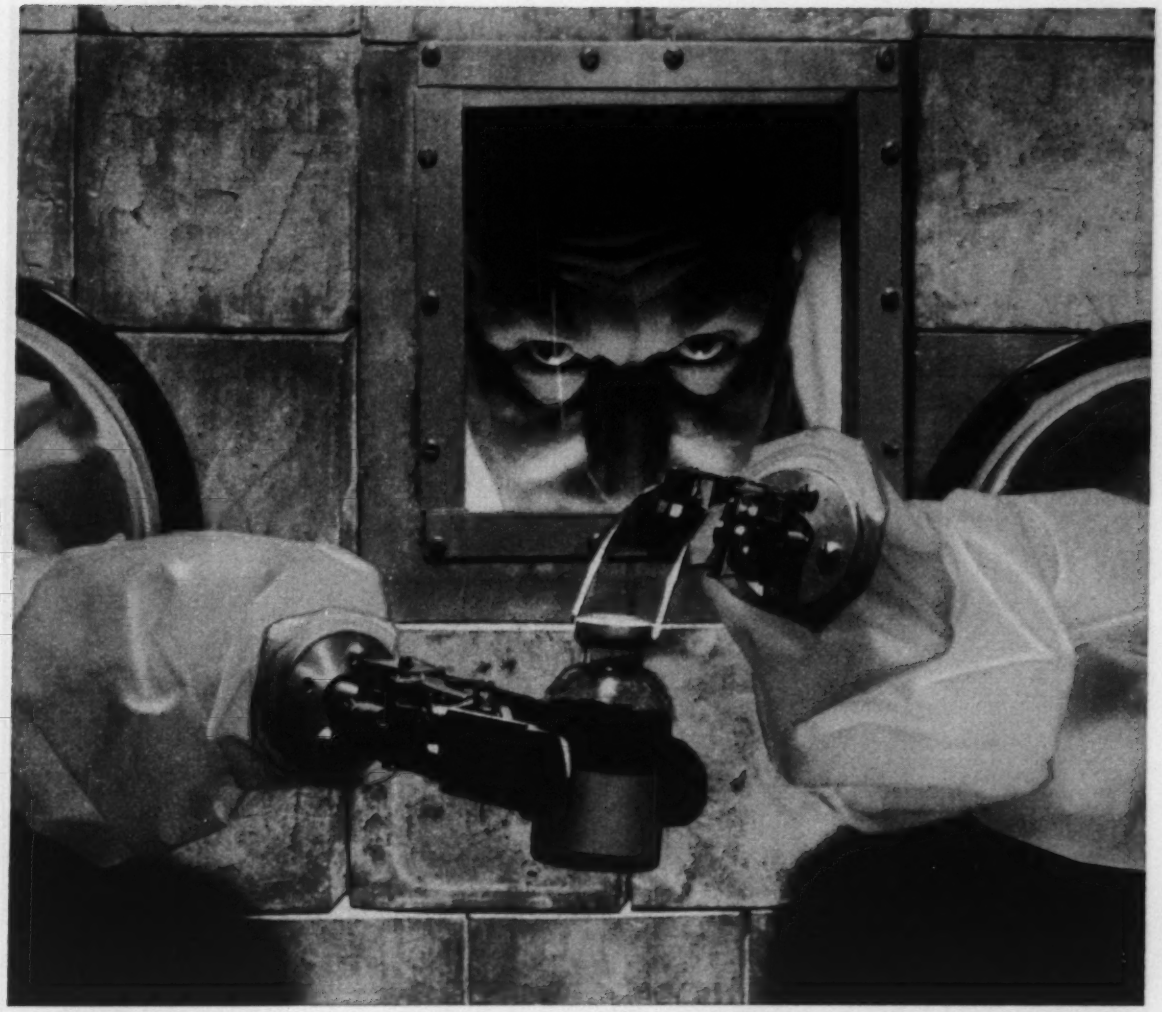
STEEL will continue to get its share of the competitive applications through the sixties, partly because of a favorable cost structure. But analysis and property improvements and more aggressive, more imaginative marketing could open an era of growth in the industry.

Metallurgists and research men at the Metal Show commented on industry goals in this decade and named those most likely to be reached.

• Many improvements will be made in steels to increase their attractiveness to present and potential users.

Pricing has helped steel stay ahead of its competition in many application areas. But vigorous development and promotion programs have boosted other materials, such as nonferrous metals, ceramics, and plastics. The same kind of effort is being applied to steelmaking and will give sales a boost through major technological improvements, says Dr. Chas. W. Sherman, technical director, Stainless & Strip Div., Jones & Laughlin Steel Corp., Detroit.

Customer demand for material improvements will undoubtedly stimulate technical progress. C. L. Altenberger, technical assistant to the president, National Steel Corp., expects more headway to be made in the area of high strength steels. And Melvin C. Metzger, metallurgical engineer-technical service, Universal-Cyclops Steel Corp., Titusville, Pa., stresses the need for greater resistance to erosion and



PRECISE TUBING HELPS HANDLE HOT STUFF

Juggling radioactive materials takes a pair of sure hands—sure mechanical hands. Malfunctions cannot be tolerated. All components must adhere to rigid specifications and operate together perfectly. A good application for precise tubing.

We make stainless steel and nickel tubing in mechanical, aircraft, capillary and hypodermic grades in sizes up to 1 inch OD—plus an amazing variety of "specialties" such as super and "exotic" alloys, glass-to-metal sealing alloys and clad metals.

In addition, we produce a vast line of platinum products and chemicals that have been used by industry for over a century.

We are unique because of our ability to *work these metals to such tiny, precise forms.* Bulletin No. 12 describes our tubular products—Catalog No. 5 describes our platinum products. Write for them.

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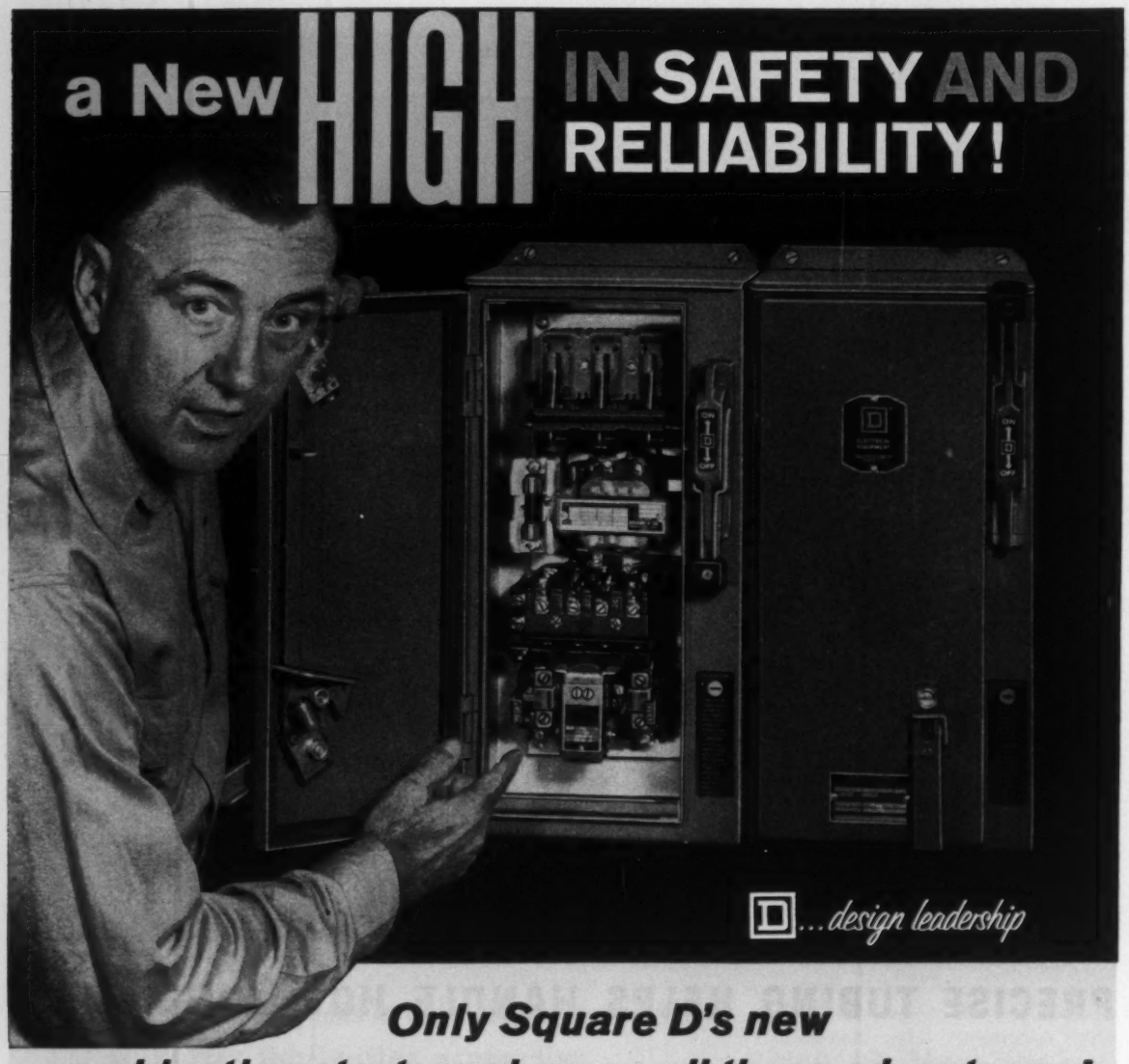

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REAL RELIABILITY! • Really dust-tight—NEMA 5-12 construction keeps out dust and coolant • Door closes snugly every time—latches at both top and bottom to make tight seal. • Simple closing mechanism—no complicated linkages to get out of adjustment. • Rugged construction throughout for extra-long life.

SO SIMPLE TO USE! • Front operation makes ganging easy. • Plenty of wiring space—all through-wiring with line terminals at top, load terminals at bottom. • Fuse clip-spacing and sizes easily changed to simplify horsepower or voltage change.

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• Metallurgists continue to strive for better steel properties, but they are increasingly aware of the importance of costs.

One expert anticipates development of steels with better weldability, formability, strength, and toughness. But another authority expects to see "leaner" alloys, containing smaller amounts of expensive alloying materials and offering the same properties as the more costly alloys. The lower alloy steels might give superior performance in some applications.

Some steels will be made with somewhat lower carbon and higher alloy content for applications in which a difference in workability or other characteristics is desirable. And more work will be done on ultrapure alloys, containing less oxygen, sulfur, and phosphorus, says Donald E. Babcock, research and technical consultant, Metallurgical Dept., Republic Steel Corp., Cleveland.

Tool steels will be made more heat resistant for such operations as diecasting, forging, or cutting of defense metals, and for extrusion, says an Allegheny Ludlum official. Machinability will be improved with better heat treating and increased use of additives like sulfur and lead. New types of carbides, rearrangement of atomic structure, and higher strength at higher hardening levels are expected to make tool steels wear longer.

Low temperature, air hardening grades of tool steels which cool satisfactorily in air from 1550° F are expected to go on gaining popularity. Several companies are making them or plan to. Norman W. Calkins, manager, tool steel sales, Universal-Cyclops, says his company plans to replace liquid quenching steels with the air hardening grades in most cases, to prevent cracking and distortion in finished tooling.

Growth in stainless steels should also continue. Development of even higher strength levels should help promote stainless in new and different applications. But sales increases and price reductions are closely correlated. One cannot go far without the other.

• Use of vacuum processes to make and treat steels is on the increase.

One steelman predicts that vacuum furnaces will melt a million tons of ingots annually by 1965; others aren't that optimistic. George E. Brumbach, manager of technical services, Carpenter Steel Co., Reading, Pa., predicts rapid growth for vacuum steel melting but less spectacular gains by other vacuum processes, such as hardening and annealing.

New techniques will be applied in the vacuum processes. Example: Improvements are expected on the methods used to make additions in the consumable electrode, vacuum arc furnaces.

Vacuum melted steels will be more attractively priced as they are produced in greater volume. They're expected to be used extensively in large forgings and somewhat less in sheets and strip.

• The importance of automatic instrumentation, from the ingot to the finished product, will get greater emphasis.

Better controls make for more uniformity in repetitive operations. And any process that is put completely under automatic control can be tailored to yield product improvements, one metallurgist says.

Instrumentation will also play a more important role in heat treating. Better controls will permit more critical operations to be done at lower cost. Treatment techniques will be chosen more intelligently, and each process will be used more generally as its usefulness is realized.

Carbon Cooled by Air Slows Blast Furnace Hearth Wear

AIRCOOLED, carbon hearths may be incorporated in new blast furnace designs, says E. M. Summers, general manager of iron production at Stanton Ironworks Co. Ltd., Nottingham, England.

The design helped solve a hearth erosion problem at the English firm —penetration of the firebrick pad and the furnace foundation by molten iron.

• Original bottom design didn't permit installation of deeper pads of conventional firebrick on some of the company's furnaces.

On two of the company's stacks, concrete plinths were removed, hearth jackets were extended downward, and pad depth was increased. Carbon sidewalls were installed and hearth jackets were spray cooled. That made for improved operation.

But in three other stacks, tops of the plinths were at ground level; hearth jackets couldn't be extended without major furnace remodeling, and deeper pads couldn't be installed. Original pads were too thin to contain downward penetration of the iron, even with carbon sidewalls.

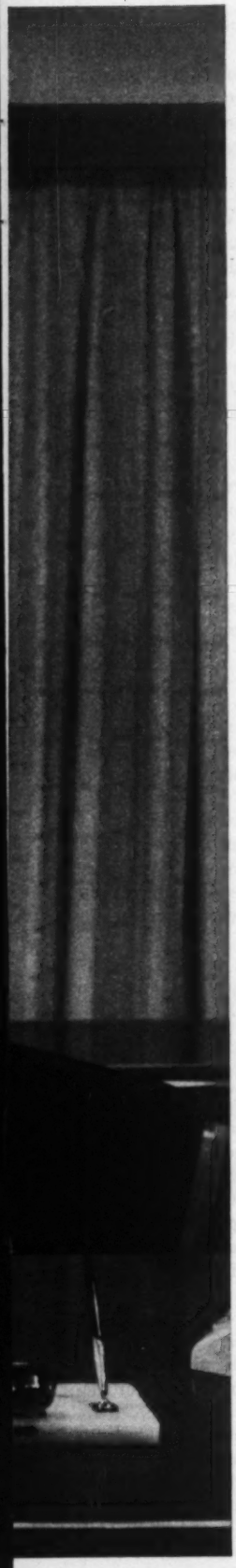
• Undercooled, carbon pads and carbon sidewalls, installed in two of the furnaces, turned in satisfactory performance.

Air was chosen for a cooling medium, because it is safer if the hearth bottom is penetrated by molten iron. In the company's No. 3 furnace, mild steel joists were laid parallel below the hearth. Ducts were completed with steel plates, welded across the joists to form an airtight, watertight bottom. Two, 4400 cfm fans were installed, and a connection was made to the cold blast main for emergency use.

Hearth walls and bottoms were constructed of carbon blocks. External, spray cooling was provided for the hearth jacket.

Air flow was rerouted in the No. 5 furnace to provide maximum cooling at the center of the hearth. Cold air is taken to the center of the hearth and returned through a series of radial ducts.

THE AMPLEXOLOGIST



The Amplexologist occasionally gets more than he bargained for. But that's not bad. It's good. In fact, it's like hitting the jackpot on the 123rd try.

Why? Well, the Amplexologist has convinced any number of manufacturers that a few of the parts in their products can be made better and cheaper by eliminating machining costs through advanced powder metallurgy (i.e. Amplexology).

Strange to say, however, many of these same manufacturers are often hesitant about exploring the broad application of powder metallurgy to their product. Well, it takes time. But sooner or later most of them take the plunge:

O.K., Genius. Let's see how good you really are. Take all the prints for our new models. Check every one. Then you tell us how many parts can be made out of powder metal. And how much they'll cost.

You see? Jackpot. And not just for the Amplexologist. For the manufacturer, too. A cost saving jackpot . . . because he's starting when designs are still flexible to take full advantage of powder metallurgy.

Challenges like this (*"You tell us . . ."*) pay off for manufacturers and for us. They have in fact, helped make us the world's largest and most experienced producer of powder metal parts. Another reason why leading manufacturers say: **When it comes to powder metallurgy —Amplex has the answer.**

"You tell us . . ."

The parts shown are a new gear train: driver gear, high and intermediate speed driven gears, low speed gear, pinion gear. These five parts plus ten more were selected by the Amplexologist—who was called in at the design stage—for powder metal production. All are finished precision parts which require no machining (except the helical gear). Estimated savings on the gear train, 86%.

AMPLEXOLOGIST

SEND COUPON **. . . if you'd like to talk over your product with the Amplexologist. Don't hesitate. He's always happy to get out of the office.**

AMPLEX DIVISION • CHRYSLER CORP. • Dept. S-11
P.O. Box 2718 • DETROIT 31, MICH.

Please have the Amplexologist call to look into the possibility of using powder metal parts in our product.

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AMPLEX

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A CHRYSLER OILITE PRODUCT

Blast Descaling Gains As Preinspection Tool

It offers an economical, effective method for removing scale from semifinished metal. In many cases, controlled cleaning makes visual detection of defects easier

Slab emerges from a descaling machine (above) at the Titanium Div., Crucible Steel Co. of America. The uniformly cleaned surface permits the inspector to mark defects for later removal in the conditioning department. Shorter pieces, such as vacuum remelt ingots (below) are rotated in the blast zone on a swing table

MECHANICAL blast descaling of slabs, billets, and bars before they are inspected is becoming extremely popular with producers and users of semifinished steel, says Wheelabrator Corp., Mishawaka, Ind.

"The inspector cannot see fine seams and cracks in scale covered steel," says one Wheelabrator official. "Scrap losses and recovery costs spiral as defective surfaces move through production."

Thorough inspection must precede the conditioning or removal of defects in the metal surface. It isn't economical or necessary to remove all imperfections, but the inspector must mark all flaws clearly. And surfaces must be cleaned properly before they are inspected.

The descaling method used must produce an exterior that is easy to inspect, with adequate contrast between the defect and surrounding material. The operation must be as inexpensive as possible. It must reveal the flaws, but it shouldn't obliterate them.

• Mechanical descaling is said to offer more effective, less expensive cleaning than other methods that have been tried.

It's claimed that blasting can remove all scale, but in many cases a lighter pass through the blast area leaves a trace of scale on the defects, making them easier for the inspector to see.

The exact extent of defects is immediately apparent; the inspector isn't likely to mark more than the necessary amount of material for removal. That saves metal, reduces conditioning costs, and makes for more efficient use of inspection time.

Properly engineered work handling facilities bring pieces to the inspector continuously. Conveying equipment carrying work from the blast zone can hold billets in a position that allows inspection of two sides at a time.

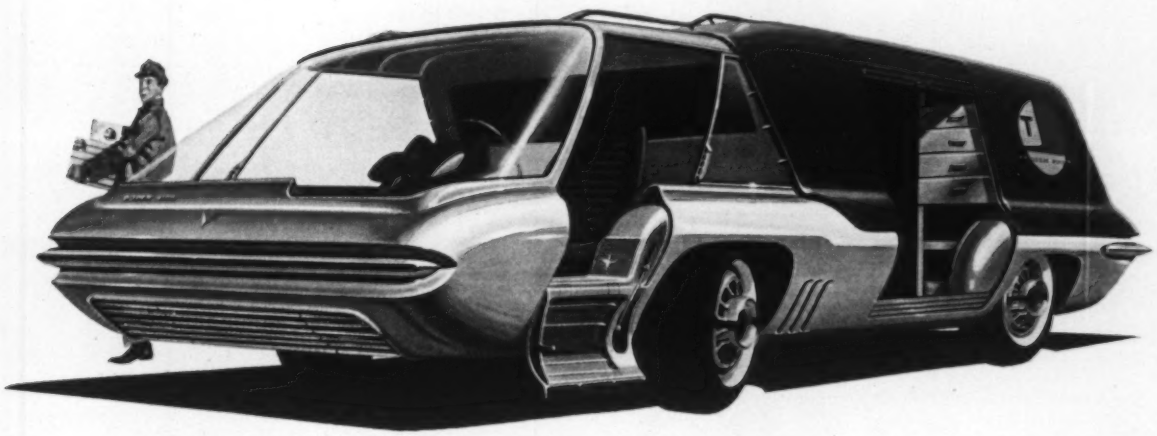
• Several producers of carbon, stainless, tool steels, titanium, and zirconium express preference for mechanical descaling.

An airless blast machine at Western Automatic Machine Screw Co. (Elyria, Ohio) a division of Standard Screw Co., permits one man to process bundles of steel bars as they pass through an unscrambler, trans-

stainless steel

No other metal has the strength, beauty and versatile qualities that serve you so well today and promise so much for tomorrow.

There is nothing like stainless steel for THE AUTOMOTIVE INDUSTRY



McLouth Steel Corporation,
Detroit 17, Michigan

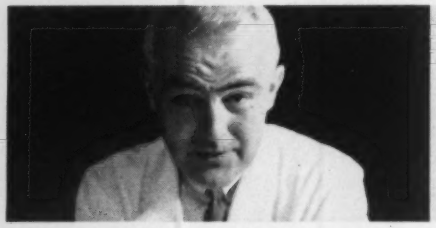
Manufacturers of high quality Stainless and Carbon Steels

Look for the **STEELMARK** on the products you buy.

McLOUTH STAINLESS STEEL

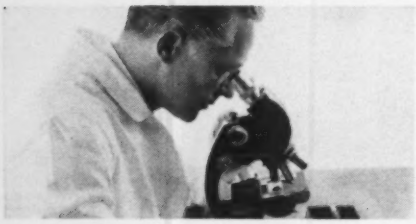
cancer! where can you turn?

A MOTHER wants to know how to guard herself against cancer of the cervix. She turns to her physician and to the American Cancer Society for the answers to her questions.



A PHYSICIAN must keep up with the fast developing facts in cancer control. He turns to his journals and the American Cancer Society professional publications and films for this information.

A BUSINESSMAN wants to protect his employees. He turns to the American Cancer Society for life-saving pamphlets, films, danger signal posters, and speakers.



A SCIENTIST needs funds to support his research on leukemia. He turns to the American Cancer Society which invests millions annually in cancer research.

A CANCER PATIENT needs dressings and weekly transportation to a treatment center. She turns to the American Cancer Society, and is helped.

The American Cancer Society is many things to many people—and is made up of many people—two million volunteer physicians, businessmen, union leaders, nurses, scientists, housewives, dedicated to one goal: saving lives from cancer. Through the Society's nationwide research, education and service programs, they hold out a lifeline to everyone threatened by cancer.

You, too, can turn to the Society. Call your local Unit for more information on what it can do for you—and, incidentally, what you can do for it.

CANCER'S SEVEN DANGER SIGNALS

1. Unusual bleeding or discharge.
2. A lump or thickening in the breast or elsewhere.
3. A sore that does not heal.
4. Change in bowel or bladder habits.
5. Hoarseness or cough.
6. Indigestion or difficulty in swallowing.
7. Change in a wart or mole.

If your signal lasts longer than two weeks, go to your doctor to learn if it means cancer.

AMERICAN CANCER SOCIETY

fer to feed roll conveyors, then go through blast equipment and into a storage rack near the drawbench. Defects are easily spotted, and the blast descaled bars are said to be extremely well suited for cold drawing.

At the Titanium Div., Crucible Steel Co. of America, Midland, Pa., descaling equipment is used to process remelt ingots, slabs, and billets of titanium prior to inspection. Some of the shorter, heavier pieces, such as ingots, are carried into the blast zone on a swing table; the table rotates so that all surfaces are exposed to the blast. Longer pieces are carried through the blast area on conveyors.

A large steel producer in the Chicago area will put an integrated descaling-inspection facility into operation early in 1961. The descaling machine, capable of handling 200 tons of billets an hour, is expected to operate at an average hourly rate of 75 tons.

At another steel plant, descaling equipment is being installed to clean stainless steel slabs up to 52 in. wide, 6½ in. thick, and 188 in. long at a rate of 7000 tons per month.

Semibright Nickel Plate Has Built-in Stability

Semibright nickel plating from a bath stated to have no harmful breakdown products is announced by Udylite Corp., Detroit. Called N2E, it is formulated to eliminate the need for batch type purification and rebuilding; tanks are continuously filtered with activated carbon, largely to remove inorganic solids.

One large automotive manufacturer is using the process in the duplex nickel plating. Udylite Bright Nickel #66 is the second step.

Two addition agents, one for the low and intermediate current density range, the other for high densities, are combined in the bath. Key to reduced maintenance lies in the stability of these agents to plating conditions.

Use of the new brighteners is made easier by the wide range of concentration over which they operate; close control of additions is not needed nor must they be filtered first, the company reports.

There's a

T-J CYLINDER

That Can Assure

Accurate Efficient Operation

Only T-J's complete line can assure you a cylinder of either air or hydraulic application—with practically limitless design specifications for bore, stroke, pressure range and even delivery requirement. From the time-tested, standard tie-rod air and hydraulic, to the exclusive T-J Spacemaker, and including the recently introduced Squair Head, T-J cylinders give you more features for efficient, long-lasting operation. Write today!

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H-47 for standard tie-rod hydraulic cylinders.

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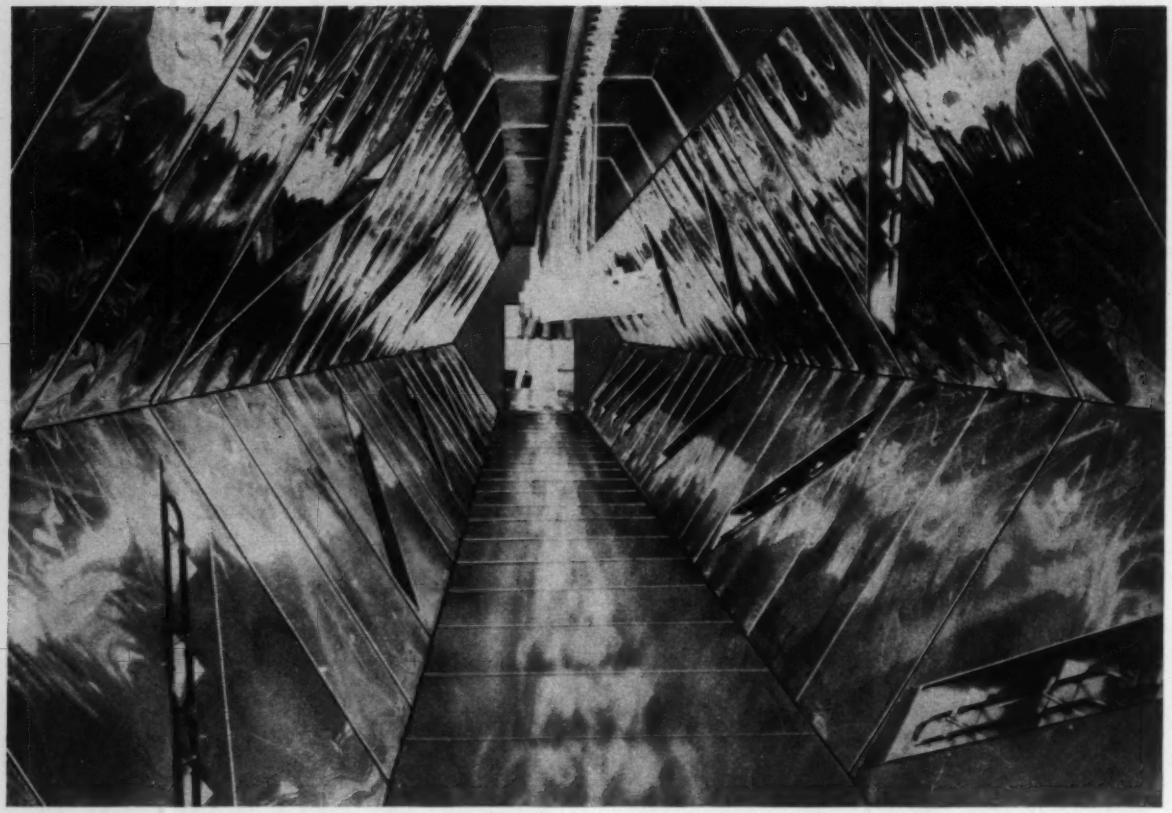


Inside view of GE, Calrod oven that's used to cure enamel on washing machine parts

Versatile Infrared Units Used to Heat, Dry, Light

Many new applications are being found in industry and commerce. Office building in Atlanta will use infrared for both heat and light. Tubular elements spur development of ovens

IF YOU have a heating or drying problem, it may pay you to consider the infrared method. Its range of applications is steadily growing.

The versatile process is being used to dry enamels and paints, heat industrial and commercial areas, thaw out cargoes in freight cars, blanch fruits and vegetables, and dry abrasive powders, clay, and mining concentrates.

• **Clears Bottleneck** — Ford Motor Co. of Canada Ltd., Oakville, Ont., installed Radiant Calrod panels as boosters on both ends of a 150 ft long, steam heated, paint drying tunnel.

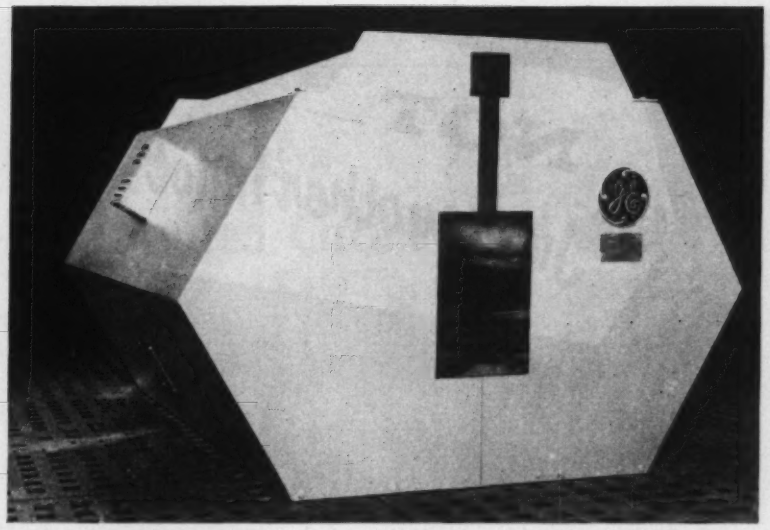
Main results: 1. The temperature drop at the entrance and exit was eliminated, which in essence, extended the length of the tunnel. 2. The elements increased heat input on the bottom of the oven where convection heat proved least efficient.

• **Heat and Light**—Most applications involve radiant heating panels above working areas and machines. Smaller infrared panels are also being developed for the heating of hotel entrances, arenas, outdoor repair shops, and airline terminals.

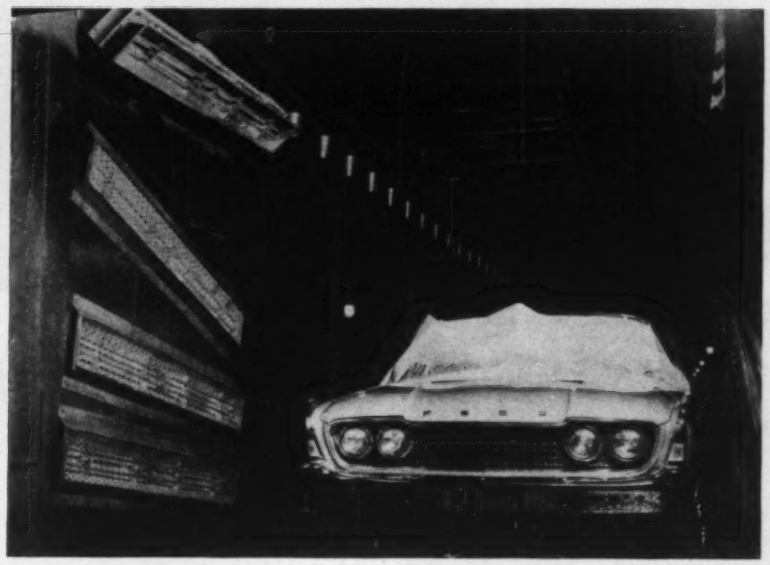
One store, Saks Fifth Avenue, New York, has installed a battery of quartz, infrared lamps under two of its marquees. They will provide both heat and light. The heat radiated is said to be equivalent to sunlight on a mild summer day.

Another step in that direction will be taken in an office building for the Georgia Power Co., Atlanta (it'll be completed in 1961). Its lighting system will also be the source of heat.

• **Speeds Enameling** — Infrared equipment is finding increasing use in the enameling industry. The drying of metal parts coated with frit suspended in water can be accelerated in an oven with metal sheathed elements.



Calrod oven with insulated sheet metal body and aluminum lining



Infrared temperature boosting section at a large convection oven for drying paint on automobiles

The heaters operate at about 1500° F, cutting drying time to minutes. Moisture is kept out of the enameling furnace, and storage space needed for an air drying process is saved.

• **Other Applications** — Infrared heating is used in thawing ore and coal in railway cars. It speeds unloading and reduces the damage to rolling stock caused when frozen contents are removed by force or open flame.

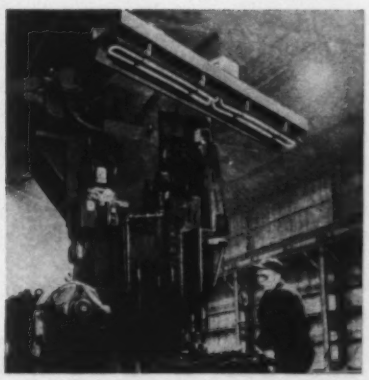
Another development is the blanching of fruits and vegetables with quartz lamps prior to canning or freezing. The process reduces water content, cutting handling and storage costs without detriment to nutritional values. Texture, flavor, and appearance are improved.

• **Oven Design Gains**—The introduction of tubular elements such as the Radiant Calrod heater has advanced the development of the infrared oven, reports G. A. Remiz, Canadian General Electric Co. Ltd., Toronto, Ont., in a paper, "New Developments in Infrared." Sizes and shapes vary. One type oven designed to accommodate the majority of applications is hexagonal in shape.

A typical shell type oven consists of an Asbestocel insulated, outer shell of sheet steel. The shell supports panel reflectors, infrared heating elements, aluminum baffles, and an insulated hood. The floor is insulated with asbestos and bright aluminum baffles. Reflective metal sheets with openings large enough to permit conveyorized work to go through are located at each end.

Efficiency of the shell type oven design largely depends on the correct layout of the sections and location of the heating panels. One of the first models to demonstrate the effectiveness of this design was a batch oven 26 by 12 by 8 ft for drying paint on automobiles. Drying time was completed in 12 to 14 minutes—40 per cent faster than expected.

The shell oven can also be equipped with lamp panels and quartz lamps. The advantage of this heat source is that cooling is instantaneous in case the conveyor stops. (Metallic heaters retain the heat for a few minutes after being switched off.) Lamps are mostly used when processing products such as paper or plastics.



Calrod heater hung above work area keeps operator warm in unheated steel plant in Northern Ontario

ROTOR SHAFT STEEL

For the Unseen Heart of a High Speed Turbine

In the heart of a turbine is a huge, single piece, forged rotor shaft.

It takes a combination of skillful, reliable men, and the finest equipment to produce the superior quality, strength and soundness required by these large, fast-rotating forgings. The Erie Forge & Steel Corporation's Research and Development program has the responsibility from selection of raw materials, through melting, forging, heat treating, machining and testing to make quality ingots and forgings that easily meet the greater technical perfection imposed by the Electrical Industry.

This 90″ diameter ingot, of high alloy steel, weighs approximately 230,000 pounds. It will be forged on this giant forging press to produce a finished machined turbine rotor shaft, weighing approximately 70,000 pounds.

Here is evidence of the capabilities offered you at Erie Forge & Steel Corporation.

Place your requirements with us, fully confident of the desired results.

ERIE FORGE & STEEL CORPORATION

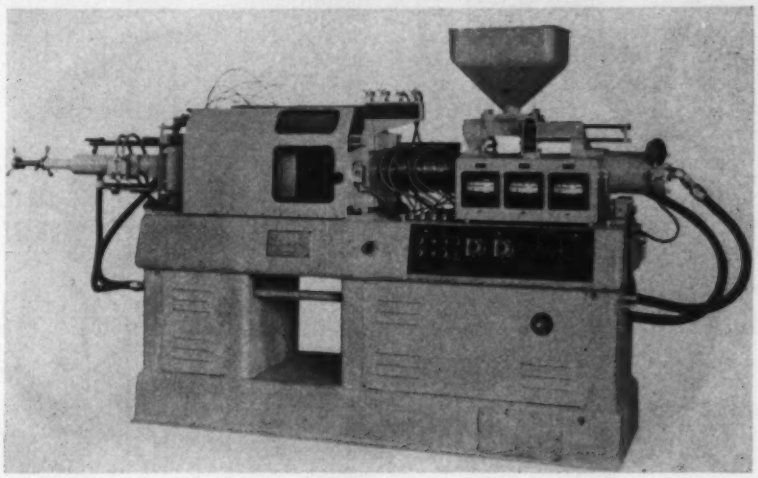
ERIE, PENNSYLVANIA

Printed Circuit Used on Injection Molding Unit

AN AUTOMATIC injection molding machine (23-12 Moslo) has been designed with an open frame base that permits finished parts to drop freely into a container or onto a conveyor system. Clamp stroke is adjustable from 5 to 12 in. Plasticizing capacity is 60 lb on standard models (80 lb optional).

The electrical system on the machine has a printed circuit, plug-in relays, limit switches, and timers. All temperature control instruments are double shock mounted on the base.

For further information, *write* Moslo Machinery Co., 2484 Prospect Ave., Cleveland 15, Ohio.



Bending Machines Handle Limited Production Jobs

PIPE FROM ½ to 4 in. IPS (iron pipe size) can be handled on a line of compact, low investment bending machines. Typical applications include low production jobs, one of a kind or experimental parts, maintenance, and similar fabrication work.

They're easy to setup and operate, require minimum floor space, and their lightness makes them portable.

Direct hydraulic operation of the pressure dies is featured on the larger machines in the line (Models C-2 and C-4). Pressure is easily adjusted by a manual control valve, and exact gage pressure can easily be read and recorded for duplication of the setup.

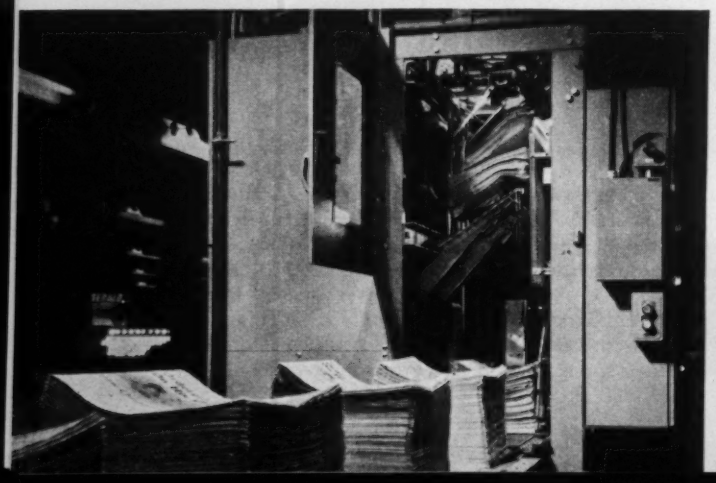
Angle of bend rotation is directly readable from a calibrated scale. The units can be easily and inexpensively tooled to bend structural shapes, solid stock, and rolled or extruded sections as well as pipe and tubing.

The Model C-4 has a capacity up to 4 in. IPS standard pipe or equivalent (such as 5 x 5 x ⅜ in. steel angles or 2⅞ in. diameter solid steel bars). It handles a maximum radius of 36 in. and bends to 180 degrees (plus overbend for springback). Floor space requirements: 3 x 11 ft. Weight: 6300 lb.

The Model C-2, which handles pipe up to 2 in. IPS, has the same design as the C-4. Floor space requirements: 2 x 7 ft. Weight: 2400 lb. Either machine can be furnished with lifting lugs, pads, or wheels. The original compact bender (Model 1400) has a capacity up to ½ in. IPS pipe or 1⅛ in. diameter steel tubing and occupies floor space of 4

(*Please turn to Page* 136)

No more hand stacking. This newspaper counter-stacker counts and stacks newspapers automatically—and can be programmed to automatically vary the stacks to meet route schedules.



No more dry pumping. Cutler-Hammer's new development—an automatic pump off control for stripper oil wells—stops the pump when oil has been lifted. Saves the pump, ups production.

What's new in control for automation?

A blast furnace that charges itself

More efficient automation because the Cutler-Hammer control systems man was called in at the start of planning. The art of charging a blast furnace is now a science.

Cutler-Hammer control engineers, with the furnace builders, worked three years to put all charging control functions into one integrated system. Now, the proper material in the proper amounts, all in a proper sequence are delivered to the furnace bell—automatically.

Every step of the operation can be checked visually on master control panels. Nothing is left to chance. The added cost of this kind of charging control is relatively insignificant. Complete flexibility in selection of furnace charging programs now makes possible optimum blast furnace performance.

Why you should call in the electrical control man early. Cutler-Hammer has been increasing productivity and lowering costs for many different companies in many different industries for years. This is a major reason why Cutler-Hammer should be called when you *start your automation planning.*

The company on the move. There's a new vitality at Cutler-Hammer—a new desire to solve problems. We've planned for the gigantic expected growth of the sixties and now we're ready—with new plants, new engineering talent, new and better products. We'd like to tell you about ourselves if you're planning ahead. Contact the Cutler-Hammer sales office nearest you.

Automation is more efficient when the control expert is called in early.

WHAT'S NEW? ASK...

CUTLER-HAMMER

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.

(*Concluded from Page* 133)

x 8 ft. Any of the models can be equipped with a hydraulically operated mandrel extractor for use on critical, small radius work.

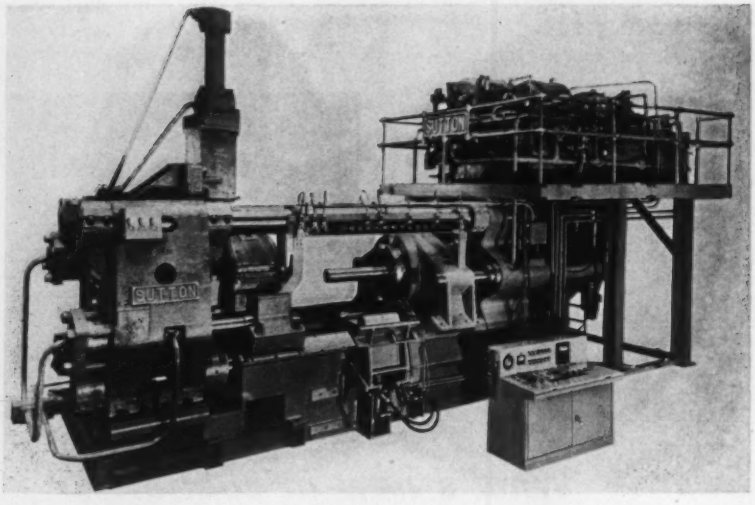
For further information, *write* Pines Engineering Co. Inc., 601 Walnut St., Aurora, Ill.

Firm Offers Colloidal Lubricant in Spray Can

A COLLOIDAL form of Teflon is dispensed from spray cans by a Freon propellent. The lubricant laid down is smooth and quick drying.

The film is nongreasy and doesn't drip or cake. It's inert to many chemicals and can be used continuously up to 600° F or down to the cryogenic range.

For further information, *write* Chemplast Inc., East Newark, N. J.



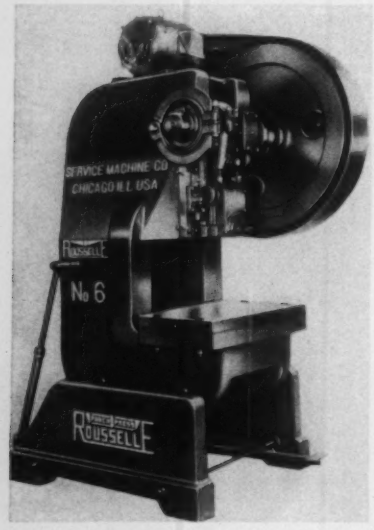
A 2200 TON PRESS FOR ALUMINUM ARCHITECTURAL SECTIONS and components is designed for automatic operation at high production speeds. Billets from 7 to 9 in. can be handled. A remote control panel on the front of the press permits starting or stopping the cycle and regulating extrusion speed from the runout table as well as from the control pulpit. For further information, **write** Sutton Engineering Co., First National Bank Bldg., Pittsburgh 22, Pa.

Versatile Punch Press Handles High Speed Work

THE No. 6, OBI Rousselle press is designed to handle heavy and varied high speed work with uniform accuracy and economy.

You can choose drives, clutches, and controls. Also available: A heavy duty, heat treated, alloy steel clutch that eliminates backup pins and locks the flywheel in both directions. An optional Econo-Air friction clutch has a self-releasing brake for fast cycling, strip feeding, and high speed, roll feed production. The air clutch permits smooth, shockless engagements at high speed and requires an extremely small volume of air.

For further information, *write* Service Machine Co., 2310-30 W. 78th St., Chicago 20, Ill.



Pedal Doubles as Shift Selector on Fork Truck

THE Monotrol control system on the SpaceSaver 20 lift truck eliminates shift levers. A wide throttle pedal doubles as a forward-reverse selector. Benefits cited by the maker include increased safety, faster operation, and less driver fatigue. The unit is rated at 2000 lb.

For further information, *write* Hyster Co., P. O. Box 4318, Portland 8, Oreg.

Burnishing Compound Doesn't Leave Soap Film

A BURNISHING compound (Oakite FM 286) for zinc, aluminum, steel, and other metals is mildly acidic and produces a brilliant blue-white color on zinc diecastings.

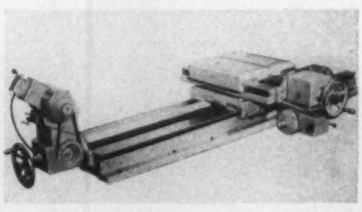
The company says it often eliminates the need for a bright dip on metals which develop oxide films. It contains no soap and doesn't leave a film to hinder plating. One user reports that operations have been cut from nine steps to one with savings of $50,000 a year.

For further information, *write* Oakite Products Inc., 134E Rector St., New York 6, N. Y.

Wide Range Offered in Feed Tables for Specials

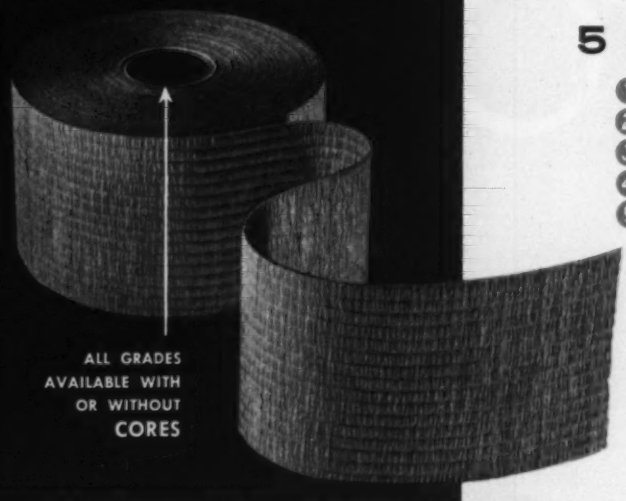
A LINE of powered, erector type feed tables and slides (for special machines) ranges from 9 in. to 2 ft wide with longitudinal travel up to 15 ft. One and two directions of feeds are available. You can get electric, hydraulic, pneumatic, or manual feed.

Precision movement; scraped, dovetail ways; and extreme rigidity are features pointed out by the



Thilco Protective COIL WRAPS

For Automatic Machine Wrapping of Steel Strapping • Steel, Copper and Alloy Wires • Aluminum Wire and Extrusions • Plastic and Rubber Hose... *and other products*



5 STANDARD GRADES

1. ASPHALT LAMINATED
2. ASPHALT LAMINATED — REINFORCED
3. BLOND LAMINATED — (Non-Staining)
4. BLOND LAMINATED — REINFORCED
5. CREPED KRAFT (Plus Custom Grades)

Featuring Thilco's NEW LONGITUDINAL PLEATING

New, exclusive Thilco LP (Longitudinal Pleating) provides two-way stretch, adds approximately 20% more lineal foot yield to Standard creped grades. This added footage per roll increases machine coil wrapping efficiency by 20% — cuts downtime by reducing the number of roll change-overs, and saves another 20% on storage space. LP increases wrapper flexibility and is especially advantageous for packaging small circumference coils. All Thilco Coil Wraps are available *with* or *without* pleating in standard widths 3" to 5½" or in special widths to order. All can also be trade-mark Print Decorated. Write for details.

NEW CREPED WEIGHTS

Now available in basis weights up to 80 lb./50 lb./60 lb. laminated (50% heavier than previous available weights) or 90 lb. Single-Ply, creped up to 50% stretch.

NEW PALLET LOAD "PUT-UP"

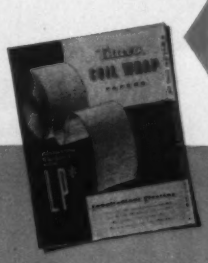
Saves Handling Costs — Increases Efficiency by 20%

Thilco Coil Wraps are compactly stacked on pallets, spindled on dowels at corners, interleaved with Thilco heavy-duty Kraft at 4-roll layer intervals to reduce shifting, then wrapped with an abrasion resistant, water-proof Thilco WRAP-DRI paper blanket which produces a sturdy, weather-resistant packaged unit. This new "pallet packing" method reduces handling costs, saves approximately 20% on storage space, provides immediate on-sight inventory and increases efficiency generally. There are many other advantages you'll want to learn about.

THILCO PAPERS INCLUDE:

- **WRAP-DRI** Waterproof protective papers
- **THILCO-TUF** Stainproof laminated papers
- **VAPOTITE** moisture-vapor barrier papers
- **POLY-COATED** and special treated papers
- **MG and MF** natural and colored krafts
- **GLASSINE** and greaseproof papers
- **SPECIAL BAGS** and case liners

Write for Thilco Brochure containing Coil Wrap Samples and complete descriptive information.



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THILCO
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THILMANY PULP & PAPER COMPANY
KAUKAUNA • WISCONSIN

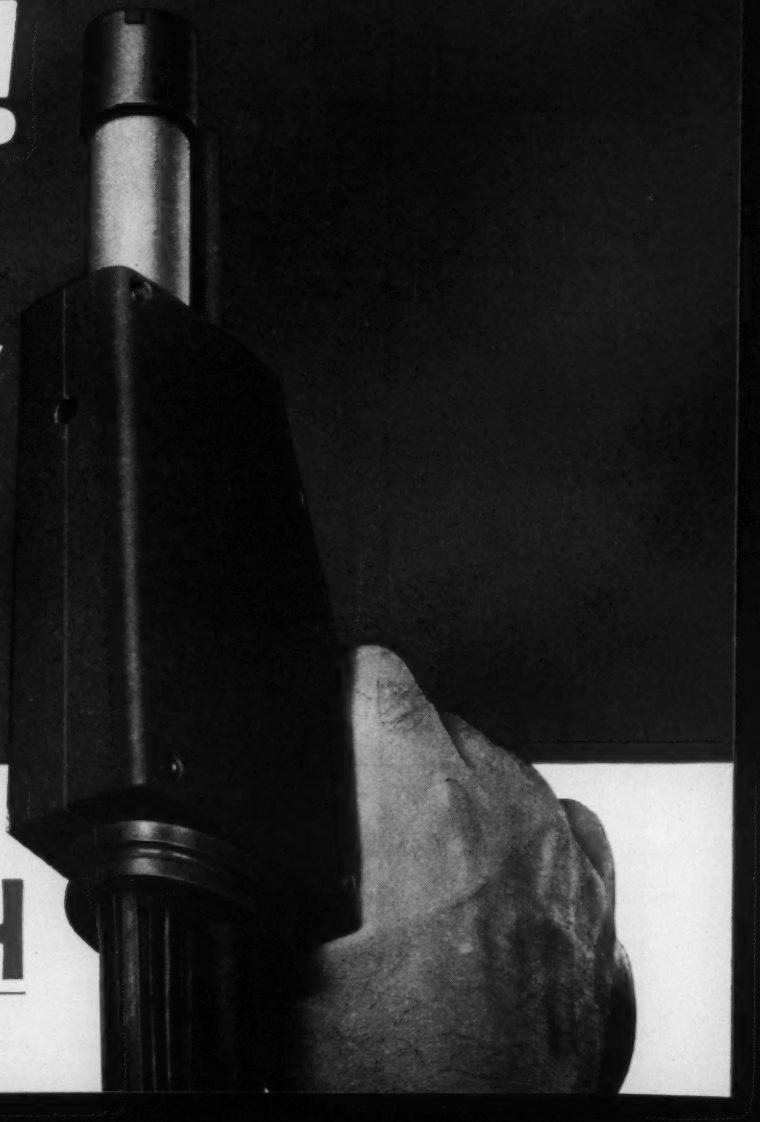
RIGHT ON THE BUTTON EVERY TIME!

The swiftest, simplest, surest way to fasten metal . . .

NEW BUTTON WELD

BY

A.O. SMITH

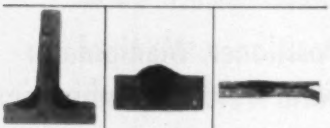


C-OMANUAL button welding boosts output . . . cuts rejects

Here's one button the zipper hasn't replaced. In fact, this button process is the latest development in welding — a development that has replaced old-fashioned spot-resistance welding and riveting.

Armed with a lightweight hand gun using A. O. Smith's CO_2 C-OMANUAL process, the operator works from one side only. The button burns through to fasten steel up to 3/16 in the downhand position and 3/64 in the vertical. And welders take their helmets off to button welding — no need to wear one with this A. O. Smith process. Simple, too! Special operator training is not required. Just place the gun . . . pull the trigger! Hold until the welding stops *automatically*. Perfect button weld every time . . . no flux to clean.

Choice of nozzles permits welding of any of the standard joints (lap, fillet, butt).



Timed fillet button weld | Typical Burn-thru button weld | Burn-thru button weld — light-gage

Other button blessings include quality low-hydrogen weld metal, high deposition rates, full utilization of weld metal for low overall costs. Put this high-speed production tool to work for you. Send for Bulletin MW-253 for details.

Through research ... *a better way*

A.O.Smith
CORPORATION
WELDING PRODUCTS DIVISION
Milwaukee 1, Wisconsin
A.O.Smith INTERNATIONAL S.A., Milwaukee 1, Wis., U.S.A.

NEW PRODUCTS and equipment

maker. Uses include the positioning or feeding of workpieces and machining units.

For further information, *write* Master Mfg. Co. Inc., 1342 E. Avenue A, Hutchison, Kans.

Lenses Range X5 to X125 In This Optical Comparator

LATERAL, vertical, and angle measuring facilities are incorporated in the PC-14A optical comparator. The unit has direct reading measurements to 0.0001 in.; high intensity, fan cooled illuminating units; a full range of Telecentric projection lenses from X5 to X125; three

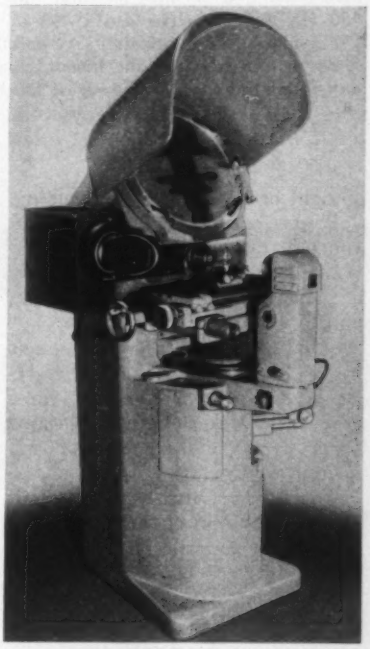
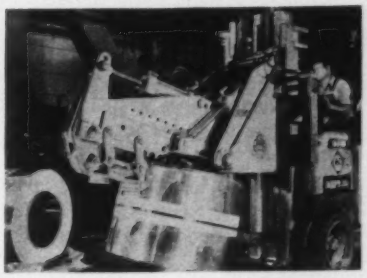


table styles; and a 5 or 8 in. diameter work capacity with a maximum of 24 in. between centers.

For further information, *write* Jones & Lamson Machine Co., Springfield, Vt.

Fork Truck Attachment Handles 6000 lb Coils

IN ONE operation, a coil manipulator (J-2611) attached to a fork truck can grab coiled stock, lift it,



and turn it from a horizontal to a vertical position. Capacity is 6000 lb. High pressure clamps adjust to any coil size and curvature.

One plant uses the unit to invert large coils of brass stock for flat stacking or further processing. By flat stacking, the problem of coil telescoping and dented edges was practically eliminated.

For further information, *write* Grand Specialties Co., 3101 W. Grand Ave., Chicago, Ill.

Honing, Superfinish Fluid Safe at High Temperatures

A NONSULFURIZED honing oil (Shear-Speed Formula 50) with a flash point of 275° F can be used with all types of honing and superfinishing machines for finishing most metals.

Odor level is low.

The coolant is also suitable for hard gear honing (as on the Michigan #999 hard gear finisher). Stock removal rates are high.

For further information, *write* Shear-Speed Chemical Products Div., Machine Tool Co., 7125 E. McNichols Rd., Detroit 12, Mich.

'Safe' Compound Removes Oily and Greasy Soils

OILY dirt, fatty soils, and greases can be removed from hard surfaces by Kelite No. 25E. It's noncaustic (alkaline) and can penetrate both oil and water-wettable soil. The product is said to be safe to personnel under normal conditions of use.

The maker says cleaning efficiency is obtained without attack on sensitive substrates such as organic finishes, aluminum alloys, brass, and other cupreous alloys. It also says it can be used in water solutions as a safety solvent for hard

surface cleaning, as a steam cleaning composition, or as a hot tank immersion soak product.

For further information, *write* News Bureau, Kelite Corp., 81 Industrial Rd., Berkeley Heights, N.J.

Die, Part Damage Reduced By Solid Film Lubricant

A SOLID film lubricant (22-T), designed for metal spinning, die stamping and forming, tube bending and wire drawing, is said to greatly reduce damage and wear to parts and dies.

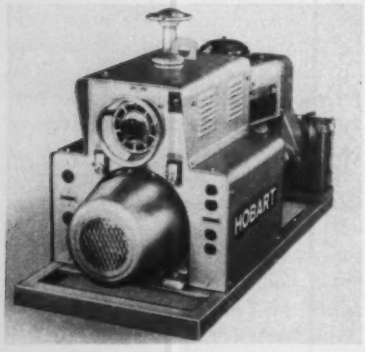
Its low coefficient of friction also allows smaller radius bends on tubing. The material is easily applied either by dipping or spraying and can be washed off the finished part in 140° F water.

On unheated spinning parts, friction temperatures dropped from the 125 to 155° F range into the 85 to 105° F range when a company switched to 22-T. It's suitable for stainless steel, aluminum, titanium, and cold rolled steels.

For further information, *write* Electrofilm Inc., 7116 Laurel Canyon Blvd., North Hollywood, Calif.

Unit Combines dc Welder With ac Powerplant

WELDING range of the Hobart GW-2235-S combination dc welder and ac powerplant is 30 to 325 amperes for intermittent use. It provides 200 amperes dc at 25 volts (on 100 per cent duty cycle) for straight or reverse polarity welding.



Power output is 2 kw at 110 volts ac of auxiliary power when welding or 5 kw of 110 to 220 volts ac when working as a generating plant.

Welding controls, welding terminals, four 110 volt ac power receptacles and two 220 volt, three wire twist lock outlets are located on a panel at the generator end of the unit.

A 14.2 hp, two cylinder, air cooled Wisconsin engine powers the generator. A trailer is optional.

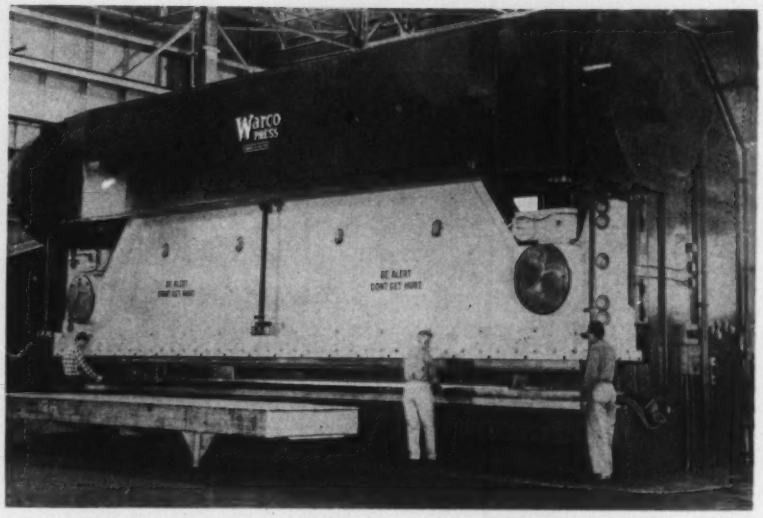
For further information, *write* Hobart Bros. Co., Troy, Ohio.

Degreaser Separates Chips from Parts

A SUBSONIC degreaser features high production, automatic, in-line cleaning of small parts. Tote pans and baskets are eliminated by a vibrating spiral elevator that moves the work rapidly through nonflammable cleaning solvents and vapors. The unit is 20 in. square by 42 in. high.

The manufacturer says the degreaser can handle the output of any screw machine, cold header, or punch press. Chips are automatically separated and clean dry parts continuously emerge ready for inspection. It's available with steam or electric heat.

For further information, *write* Manpro Corp., 1370 Hilton Rd., Detroit 20, Mich.

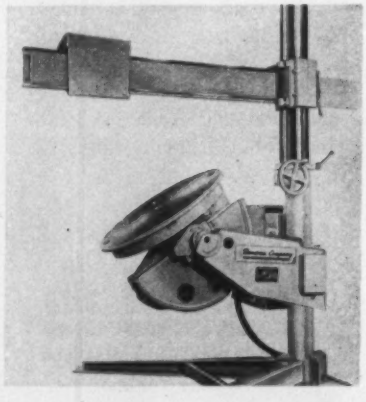


ALUMINUM SIDING AND ROOF DECK PARTS ARE BEING FORMED by one of the leading aluminum manufacturers on this 1000 ton press brake. It can handle lengths up to 40 ft. Individual adjustments can be made on each ram connection, making it possible to form tapered parts. Distance between housings is 450 in. Area of slide is 6 x 492 in. Stroke is 9 in. The unit requires about 151 x 528 in. of floor area. It operates at 12 strokes a minute. Equipment includes a Warco pneumatic friction clutch and brake with electrical control. For further information, **write** Federal Machine & Welder Co., Warren, Ohio

Positioner, Manipulator Form Welding Combination

CAPABLE of handling 2500 lb, a 4 by 4 ft Ransome positioner-manipulator for welding is free standing.

Features include a precision, elec-

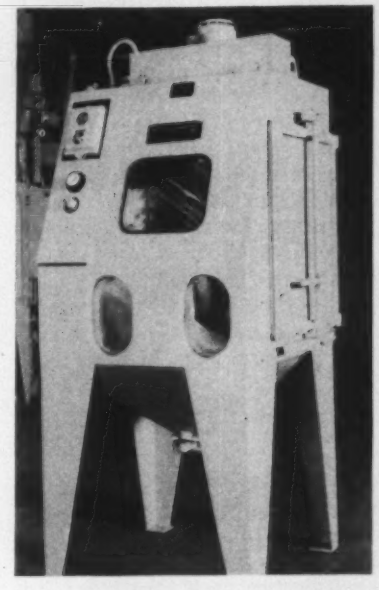


tronic variable speed drive, power operated tilt, and remote operator's control station. The manipulator is manually elevated for arc height adjustment by an acme screw, and the head support side beam carriage is manually adjusted with a rack and pinion and lock to cover the welding area handled by the positioner table.

Other Ransome positioners and manipulators can also be produced as single units.

For further information, *write* Ransome Co., Scotch Plains, N. J., or Houston, Tex.

Wet Blasting Simplified



A WET blasting unit (Peenamatic Model 826) is being offered with pneumatic action (for simplicity) or with a motorized pump for greater output.

The packless pump has a special wear plate which prolongs the service life of the unit. Both the impeller and the special wear plate are quickly and easily replaced at moderate cost. Downtime is virtually eliminated.

Features include a window washer, a movable gun mount, a removable hatch for blasting long parts, a high capacity exhaust fan and filter, and instant slurry change.

For further information, *write* Metal Improvement Co., 1721 E. 47th St., Los Angeles 58, Calif.

Automatic Unit Drills ½ in. Holes in Cast Iron

AN AIR powered, hydraulically controlled, automatic drilling unit has been added to the Govro-Nelson line. The unit (Model 300) develops a 3 to 1 thrust, has a 3 in. stroke, and can drill ½ in. holes in cast iron. The hydraulic control is integral and externally adjustable for rapid approach, rate of feed, and stroke length.

The air power thrust and the hydraulic counterthrust are applied along the center line of the quill. That setup eliminates quill deflection when the thrust or counterthrust are applied off-center, and improves the drilling accuracy and life of the unit.

The air and the hydraulic cylinders are divided into two parts (upper and lower) to avoid the

EXECUTIVE REPORT #29

BETTER SURFACE PREP ATION

...Wheelabrator® does an eight hour job in eight minutes!

Better surface condition than was achieved in 8-hour wet tumbling cycles is now accomplished in just eight minutes in a Wheelabrator Super Tumblast at Landers, Frary & Clark, in preparation of food chopper parts for tinning. Space requirements were reduced three-fourths with the elimination of the 30 wet tumbling mills. One man does work that formerly required three. Breakage has been reduced sufficiently to eliminate one inspection. "The Super Tumblast modernized a practically primitive operation", according to the Landers, Frary & Clark foundry superintendent.

Modernizing with Wheelabrator airless blast equipment can save you time and money, and result in a superior product as well. It costs nothing to have a Wheelabrator engineer give you all the facts. Write to Wheelabrator Corp., 509 S. Byrkit Street, Mishawaka, Ind. In Canada, P. O. Box 490, Scarborough, Ontario.

WHEELABRATOR
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excessive length that would be required if the cylinders were arranged in tandem. Dividing of the hydraulic cylinder also eliminates the need for a separate sump and valving to keep the cylinder completely filled.

Opposed ends of the divided hydraulic cylinder are the pistons, and the volume varies with the amount of oil in the unit.

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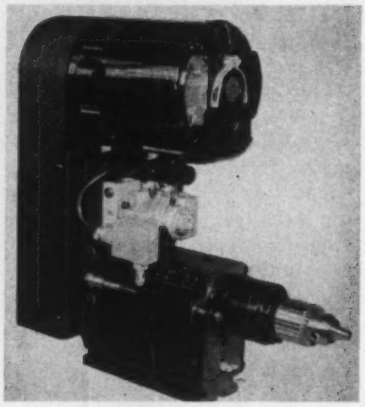
Spindle speeds up to 8000 revolutions per minute can be obtained on standard units (up to 15,000 rpm on specials). A line of attachments is available for automatic machines. Any standard foot-mount motor may be used. The spindle has a standard Jacobs E taper. Chucks, collet chucks, and sleeve adapters are available.



For further information, *write* Govro-Nelson Co., 1931 Antoinette, Detroit 8, Mich.

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For further information, *write* Branson Ultrasonic Div., Branson Instruments Inc., 40 Brown House Rd., Stamford, Conn.

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NEW literature

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Heat Treating Variables

A 24 page technical research report discusses the properties and heat treatment of hardenable stainless steels that have chemistries suitable for investment casting. WaiMet Alloys Co., a division of Howe Sound Co., 5320 Oakman Blvd., Dearborn, Mich.

Refractories Data

Special sections of a 16 page book, *Refractories: Nucleus of Industry*, discuss such topics as: Sources of raw materials, control testing begins with minerals still in the ground, mining of refractories, quality control from blasting to batching, and how refractories are working for you. Harbison-Walker Refractories Co., Pittsburgh 22, Pa.

Tubing and Pipe Analyses

Bulletin T-456 shows the chemical analyses of the standard carbon, alloy, and stainless tubing steels used for corrosion resistant service, or elevated temperature or pressure service. It is cross-indexed to associate grade and ASTM specifications with Nicloy, Croloy, and specialty tubing steels. Tubular Products Div., Babcock & Wilcox Co., Beaver Falls, Pa.

Cold Roll Forming

Uniformity, accuracy, strength-weight ratio, surface finish, and versatility of cold roll formed sections are discussed in a folder. Solar Steel Corp., 651 Lehigh Ave., Union, N. J.

Automatic Control Systems

A 16 page bulletin (MSA-189) demonstrates how automatic controls can be successfully applied to older furnaces as part of an over-all modernization program, resulting in increased furnace capacity and faster material handling facilities. Hagan Chemicals & Controls Inc., Hagan Center, Pittsburgh 30, Pa.

Speed Calculator

A disc calculator finds the surface speed, in feet per minute, of any wheel from 1 to 60 in. in diameter, turning at spindle speeds from 220 to 20,000 rpm. Hanson-Van Winkle-Munning Co., Church Street, Matawan, N. J.

Sintering

A 16 page bulletin (No. 603) sets forth the advantages, physical properties, and applications of powdered metal parts, discusses design principles and illustrates the different types of furnaces that are being used to heat treat the compacts. Electric Furnace Co., 600 W. Wilson St., Salem, Ohio.

Display Devices

A brochure compares electrochemical characteristics of industrial cathode ray tubes and recording storage tubes. Industrial Components Div., Raytheon Co., 55 Chapel St., Newton 58, Mass.

NEW BOOKS

Temperature Measurement and Control, W. F. Coxon, Macmillan Co., 60 Fifth Ave., New York 11, N. Y., 314 pages, $12

The volume is an introduction to the problems of temperature measurement and control with much of the theoretical mathematics omitted. Physical data are presented in the first part of the book and a discussion of instruments and control methods follows.

Cermets, edited by J. R. Tinklepaugh and W. B. Crandall, Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y., 239 pages, $9.50

This survey of oxide and carbide base cermets includes contributions from 23 authorities. It covers such things as fundamentals, forming, processing, testing, and applications. Considerable space is given to the physicochemical aspects. The sections covering material preparation and fabrication are somewhat limited by the proprietary nature of the information.

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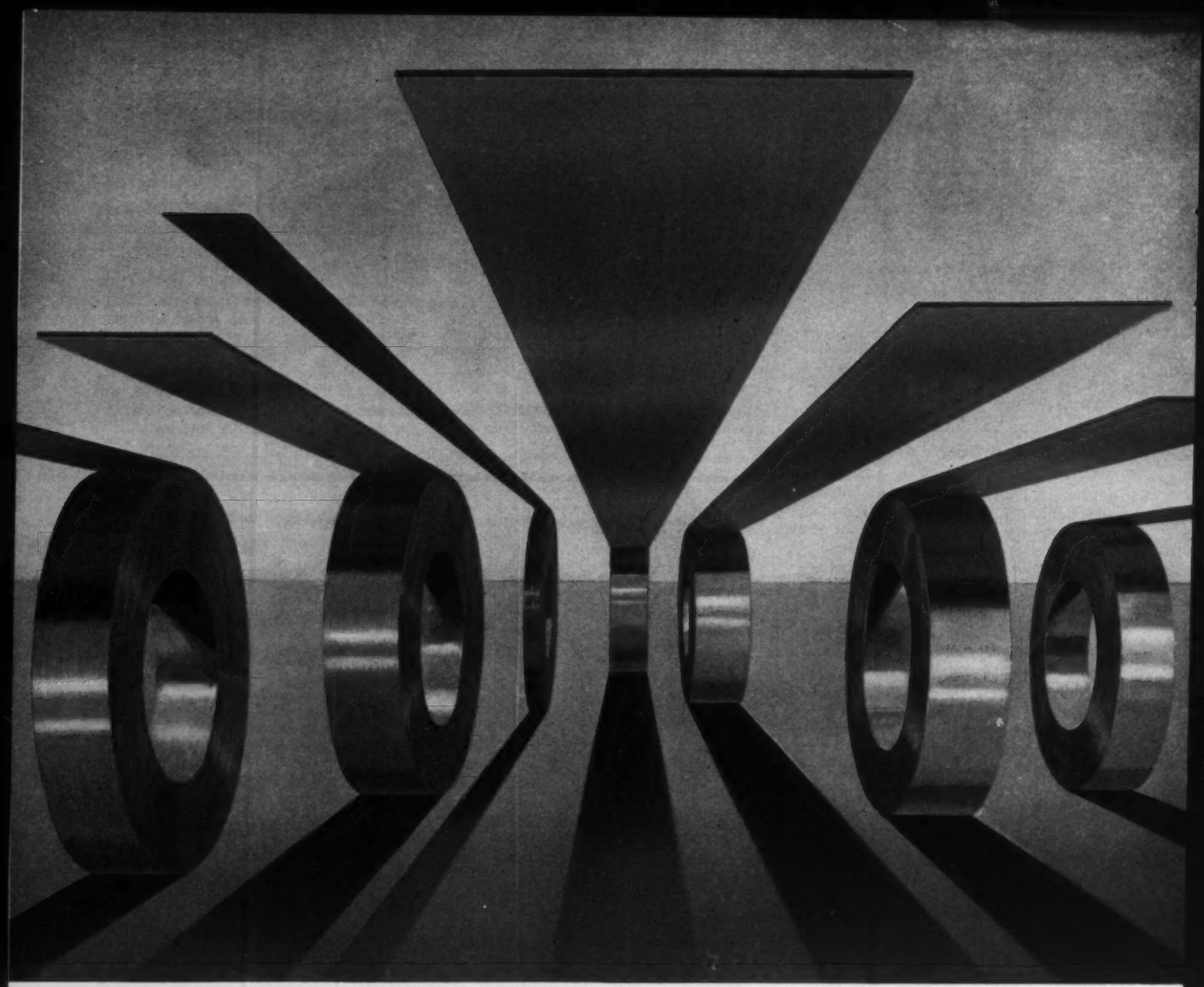

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Sidewise Movement Persists

FOURTH QUARTER steel production may not be any larger than the third quarter's unless there's an abrupt end to inventory liquidation.

Market analysts have been forecasting the end of the cycle for months, but it continues. Consumers have trimmed their stocks from a peak of 18.5 million tons in April to about 11 million tons. Still, inventories are larger than they were at the end of the strike (10 million tons). What's more, they're balanced. They can drop even lower without causing hardships for users.

AUTOMAKERS TIGHTEN BELTS— "It's only natural that we are reducing inventory," says George Romney, president of American Motors Corp. He blames the steel companies for "bad information" following the strike and charges that their failure to make firm commitments on deliveries last spring forced AMC to order premium steel, which led to overstocking.

Steelmakers have said since September that the orders they've been getting from auto companies "don't reflect consumption." (Automakers built 700,000 more cars in the first ten months of 1960 than they did in the corresponding period last year.) By one estimate, 20 per cent of the steel currently going into cars is coming out of inventories.

DISTRIBUTORS TRIM STOCKS— At steel service centers, inventory liquidation is nearing an end. Distributors have cut their stocks from an all-time high of 3.8 million tons in June to about 3.3 million tons.

REASONS FOR LIQUIDATION— In a speech at Pittsburgh, James L. Rich, assistant director of commercial research, U. S. Steel Corp., cited these reasons for the inventory cutting that has been going on since May 1. Efforts by many consumers to adjust their stocks to declining business prospects. 2. A capacity in the industry that assures ample and quick supply. 3. The prospect of labor peace for some time to come. 4. Foreign sources of supply if domestic shortages develop. 5. Better management techniques in the control and planning of inventories. 6. The cost and availability of funds for carrying inventories. 7. The increasing squeeze on profits which makes the carrying of even normal inventories burdensome.

CAN'T LAST MUCH LONGER— Mr. Rich believes that "inventory cutting has gone about as far as it can go and that further liquidation will be slight. Since most steel consumers will go into 1961 with stocks well trimmed, he adds, next year's ingot production should closely parallel consumption. Looking at early 1961, he predicts: 1. Somewhat less activity in machinery, autos, appliances, and railroads. 2. Better prospects for containers and certain types of construction. 3. A more favorable balance between exports and imports.

NOT MUCH HEDGING— With an automatic boost in steel industry wage rates only two weeks away, consumers haven't made much of an effort to protect themselves against the possibility of a price hike. Structural fabricators have done a small amount of hedging—not by increasing their inventories but by requesting November shipment of steel that will be needed in work scheduled for December.

PRODUCTION DROPS— Last week, steelmaking operations declined 0.5 percentage point to 51.4 per cent of capacity. Production was about 1,464,000 ingot tons, the smallest output in a nonholiday week this year.

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*Current prices were published in the Nov. 7 issue and will appear in subsequent issues.

CAMERON
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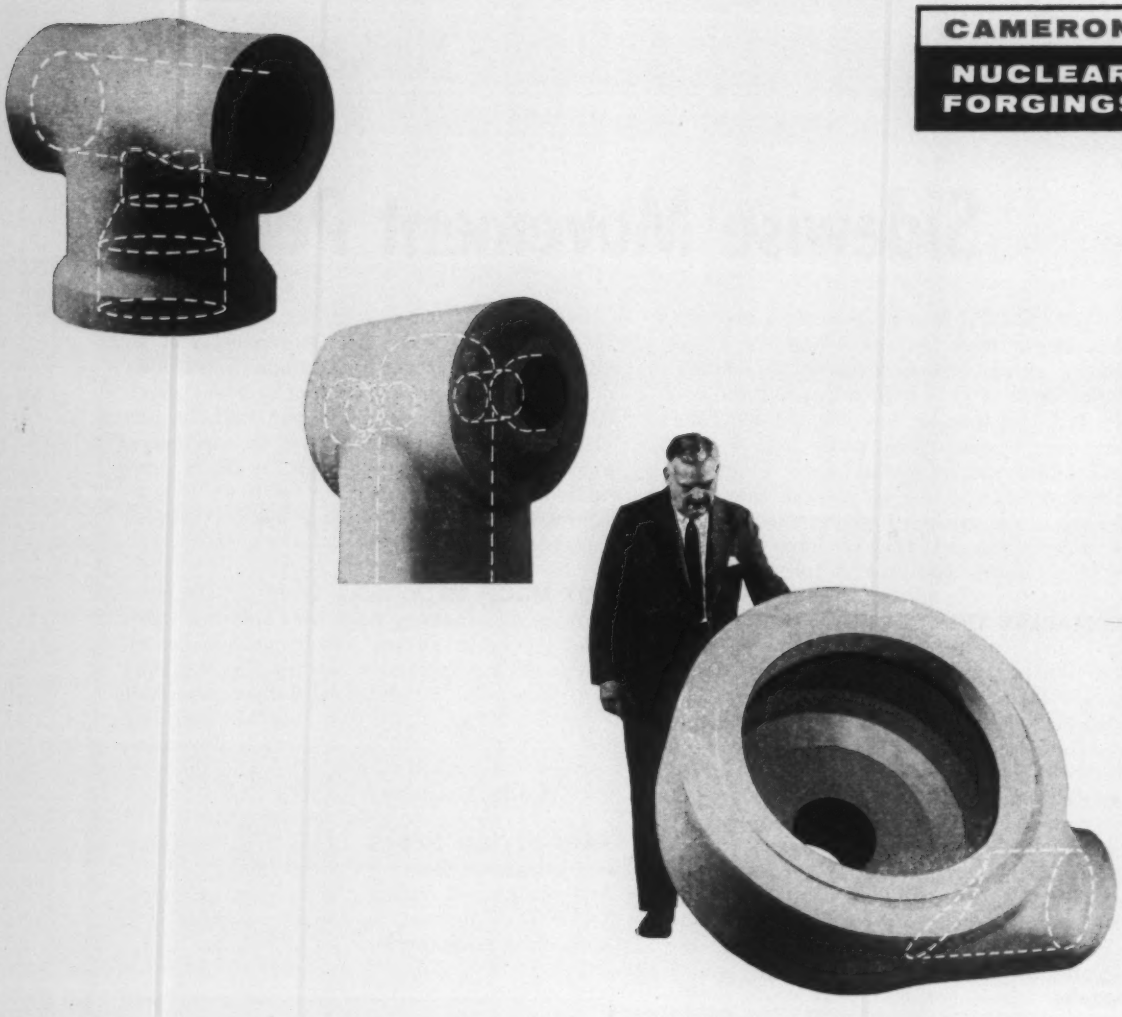

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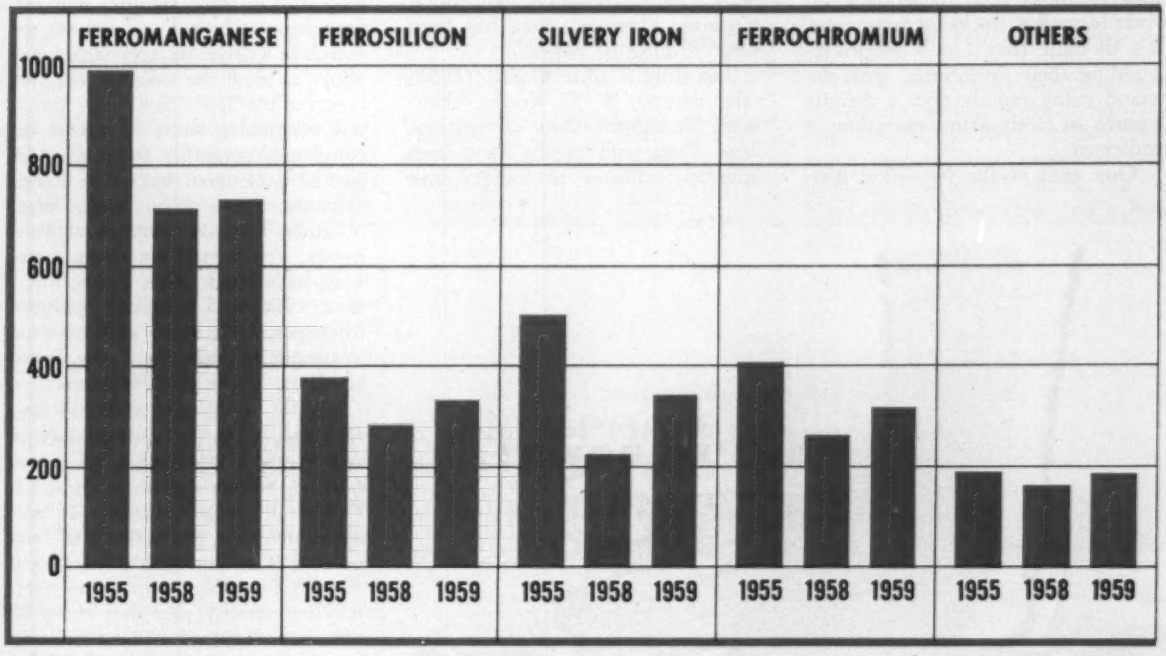
PRODUCTION OF FERROALLOYS

(Thousands of net tons)



*Includes: Alsifer, ferroboron, ferromolybdenum, ferrotungsten, ferrovanadium, simanal, spiegeleisen, zirconium-ferrosilicon, ferrosilicon-zirconium, aluminum silicon alloy, ferrotitanium, ferrophosphorus, and other miscellaneous ferroalloys.

Steelmaking Pacing Ferroalloy Demand

MODEST improvement in sales of some ferroalloys is hoped for this quarter, despite the sluggish pace of steelmaking.

But leading industry executives say a sustained upswing in demand —one that will carry into 1961— hinges upon more robust steel production than has been experienced so far in the fourth quarter (the ingot rate has ranged between 51 and 55 per cent).

Swings in steelmaking hold the key to market activity for the ferroalloys—important as additives and alloys. They're used to control steel production, facilitate processing of finished products, impart desirable properties to steel, resist corrosion, and provide heat resistance qualities. Demand for ferroalloys not only reflects changing production patterns in steel, but promptly mirrors metallurgical innovations and advances as well.

• **Steel Output Up**—This year steel production will total around 100 million net tons of ingots, short of early in the year predictions, but up around 7 per cent from the 93.4 million tons poured in strike-afflicted 1959. That should mean larger over-all ferroalloy use this year, with production probably slightly topping the 1.9 million tons produced last year (see comparative chart). Annual production has averaged 2.1 million tons over the last decade.

Consumption has been at low ebb in recent months because of the sharp decline early in 1960 in production of stainless and other high alloy steels, points out G. E. Drake, vice president, Union Carbide Metals Co., a division of Union Carbide Corp., New York. January's stainless output of 71,097 net tons compares with August's 44,289 tons. Similarly, alloy steel production dropped from 579,376 tons in January to 292,644 tons in August.

• **Total Off Slightly**—Despite the sharp sag in steel production, starting in the second quarter, alloy steel and stainless shipments for the first eight months of this year fell only a little short of the totals for the like period of strike-bound 1959. Alloy shipments were 3,254,439 tons vs. 3,488,242, while stainless

were 410,751 tons vs. 444,767.

Sales and shipments of steel products from here on should be more in keeping with consumption, resulting in some improvement in ferroalloy business. Since the steelmakers have been depending on their ferroalloy stocks for some time, it's thought they'll now begin rebuilding their inventories, with demand rising rapidly once a definite upturn in steelmaking operations is indicated.

One area of the ferroalloy market providing encouragement to producers concerns prices. Price cutting was prevalent a year ago; now it isn't so much in evidence. W. E. Remmers, president, Pittsburgh Metallurgical Co., Niagara Falls, N. Y., says that while competition continues vigorous, there has been some firming of prices.

Reporting a nine month (1960) sales decline, W. C. Keeley, chairman, Vanadium Corp. of America, New York, said profits have been adversely affected in some degree by inventory adjustments arising from sharp declines in world prices for chromium and manganese ores.

● **Pushing Improvements** — Despite slow demand, ferroalloy makers are modernizing their facilities and are promoting technical and market research in a drive for new metals and alloys to meet the exacting requirements of the Space Age. The industry, comprising some 35 producing companies operating more than 50 plants, is centered largely in Pennsylvania, Ohio, New York, West Virginia, Iowa, Alabama, and Tennessee. Fourteen other states, however, have plants: New Jersey, Montana, Illinois, Virginia, Oregon, Michigan, Indiana, California, Washington, Idaho, Kentucky, South Carolina, Texas, and Florida.

The U. S. Bureau of Mines says ferroalloy capacity and production will continue indefinitely to be related to factors similar to those affecting the steel industry. It estimates domestic production will hover near 2 million tons a year until there is a significant change in steelmaking capacity, and that about 85 per cent of output will continue to be alloys of manganese and silicon.

Technical problems of the industry, it says, include development of new products, methods for using concentrates rather than lump ore, and production of satisfactory alloys from low grade rather than high grade, direct shipping ores, reserves of which are shrinking.

Production of ferroalloys requires large quantities of electric power. That presents a problem, especially in times of high industrial activity when electrical energy is at a premium. The situation, in part at least, gives rise to expectations that over the long term there will be gradual migration of ferroalloy producing plants to Southern and Western states, where expanding power projects hold forth the alluring promise of ever adequate power supplies.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 158

Seasonal slackening in demand for concrete reinforcing bars is noted at the producers' level, but demand is still holding up at fabricating plants. Order backlogs are slipping, however, and with awards tending downward, mill operations

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are expected to slacken over coming weeks.

Among sizable contracts before the market are 5000 tons for the Lake Washington floating bridge and 3500 tons for highway spans in Washington State.

Steel Bars . . .

Bar Prices, Page 157

Hot rolled carbon bar consumers are covering their needs as they arise, and there is no attempt being made to build up inventories. Demand continues diversified but, in general, is lagging.

Producers of cold finished bars report much the same market situation. Many of them describe business as "lousy." For some, that means operations at about 40 per cent of capacity.

Sales have been moving sidewise on a low plateau for several months, and the odds are against a change for the better this month. Reasons: 1. Some customers are still reducing their inventories. 2. Others are consuming bars at a slower rate than anticipated because of reduced demand for their finished products. 3. Imported autos and machines are displacing domestic products that are major consumers of bars.

Of the major bar markets, automotive is currently the strongest, although it's not as active as some steel suppliers had hoped it would be. Agricultural equipment is in a seasonal slump. Demand from textile machinery manufacturers has tapered off.

There's no evidence that consumers are hedging against a possible price hike.

Finished Steel Shipments Decline During September

Mill shipments of finished steel products in September totaled 4,983,228 net tons, reports the American Iron & Steel Institute. The total compares with 5,071,953 tons shipped in the preceding month and 1,282,664 tons moved in September a year ago, when the steel strike was on.

Shipments for the first nine months of the year amounted to 57,612,825 tons vs. 54,939,267 in the same period of 1959.

The principal products shipped in September and the first nine months were:

Products:	September (Tons)	Nine Months (Tons)
Sheets, cold rolled	1,025,908	11,695,153
Sheets, hot rolled	584,504	6,471,677
Bars, hot rolled	465,216	5,575,198
Plates	373,205	4,964,788
Tin plate, electrolytic	356,036	4,279,724

Shipments to major markets direct from the mills are shown in the table:

Markets:	September (Tons)	Nine Months (Tons)
Automotive	1,128,098	11,568,030
Warehouses	830,438	10,221,780
Construction	714,328	7,773,419
Containers	429,642	5,418,702
Contractors' products	250,359	2,936,471

Sheets, Strip . . .

Sheet & Strip Prices, Pages 158 & 159

Sheetmakers report demand is now getting less support from the automobile industry than it was a month ago, but from other directions the pace of orders is about the same.

Most consumers are buying hand to mouth, with mill deliveries ranging around two weeks on hot rolled and two to four weeks on cold rolled. Galvanized sheets can be had within three weeks, off a little

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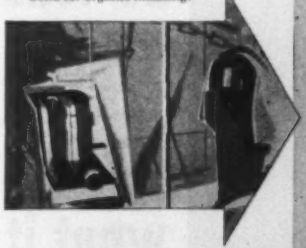

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9. **LESS SLUDGE**–less scale. Minimizes clean-up problems.
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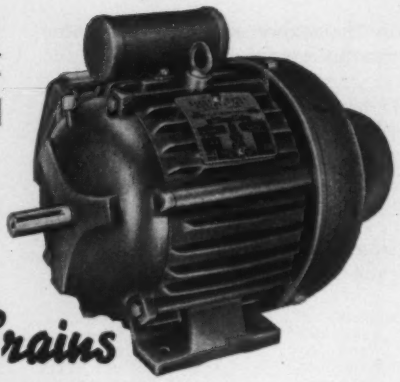

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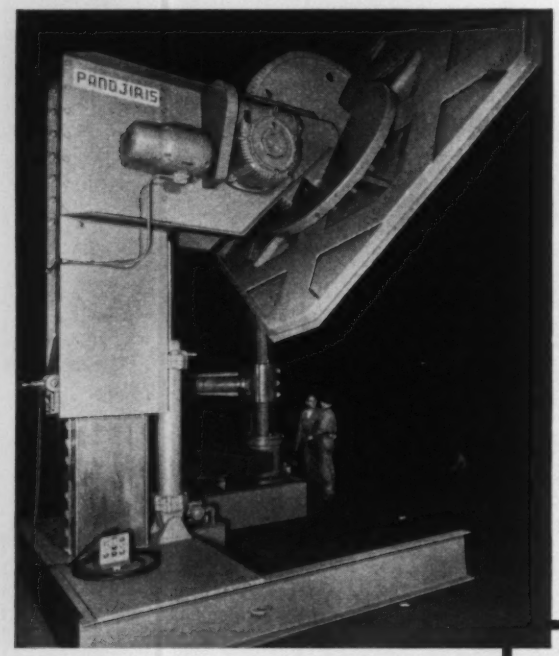

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from a month ago, reflecting seasonal influences.

The outlook for sheet business is for a continued lag the rest of this year. There's little expectation that November sales will be larger than last month's. Pittsburgh mills now have no more business booked for November than they had on their books for October a month ago. Forty per cent of the tonnage they'll ship this month will have been booked after Nov. 1.

Automakers have tentatively scheduled 600,000 assemblies for November (vs. 618,000 in October) so, at best, they'll continue buying at the October rate. Although their inventories are low, some car companies are continuing to liquidate stocks. Purchasing men at a stamping plant of one of the Big Three recently told steel salesmen they're aiming at a 15 day inventory of sheets.

To meet customers' demands for quick deliveries, sheetmakers are maintaining high level slab inventories. They can cut delivery time by one week if they can avoid starting at the open hearths.

Plates . . .

Plate Prices, Page 157

Some platemakers say prospects for business are a little better. October bookings of some mills were the best since June. While others didn't notice a sharp pickup, the gain in orders was enough to warrant the belief that inventory liquidation is coming to an end. Plate deliveries range two weeks.

More shipwork is being figured, and there is more inquiry out for estimating projects contemplated after the turn of the year. Most makers, though, look for no sharp upturn in purchases until well into the new year. At least one Eastern mill doesn't anticipate brisk buying until the second quarter.

However, some encouraging signs are noted here and there. The Harrisburg, Pa., producer has resumed operation of its 126 in. mill after a suspension of a month, and is planning to resume production on its universal mill.

Sun Shipbuilding & Dry Dock Co., Chester, Pa., is low bidder on four cargo ships for the American Export Lines. Each vessel will re-

quire 7000 tons of steel, mostly plates.

Plate fabricators lost to prestressed concrete in competing for Seattle's, Beacon Hill, 51 in. pipe supply line. Around 850 tons of plates would have been required.

Tubular Goods . . .

Tubular Goods Prices, Page 161

The upturn in demand for oil country goods that started in October appears to be continuing, but the improvement is small in terms of tonnage—so small that most tubemakers are operating less than 40 per cent of capacity. At some mills, October bookings were as much as 50 per cent better than September's—but sales executives point out that September was one of the worst months of the year.

November volume will probably exceed October's by a small margin. Major oil companies still have large inventories of certain types of pipe, but they're running out of popular sizes. Since they can no longer meet their needs by swapping among themselves, they're buying directly from the mills in barge loads.

The number of rotary oil drilling rigs operating in the U. S. and Canada increased three to 1703 in the U. S. and 143 in Canada, in the latest weekly survey of the Hughes Tool Co.

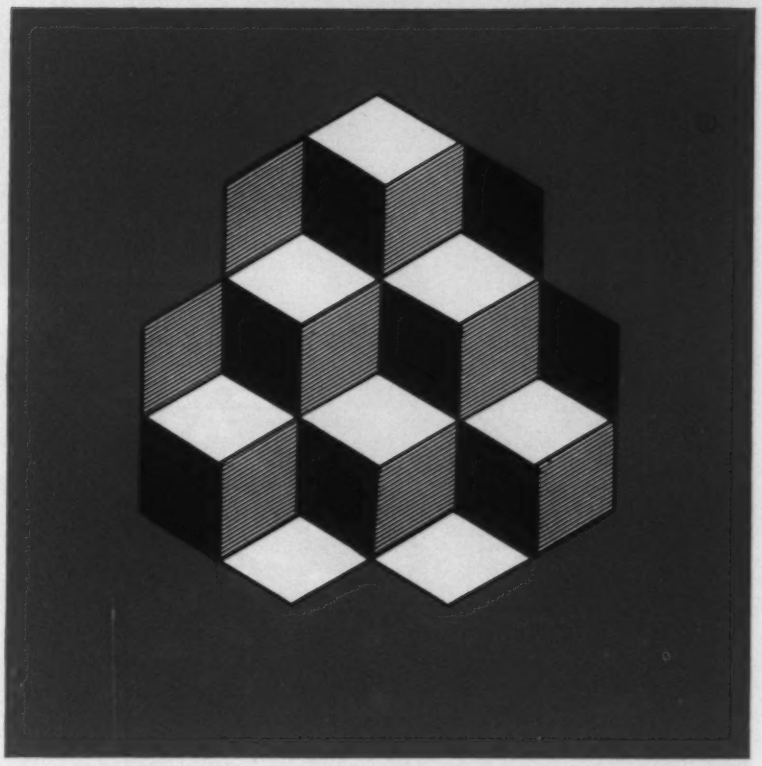
Municipalities are expected to come out shortly with inquiries for next spring's cast iron pipe requirements.

A. M. Byers Co., Pittsburgh, producer of wrought iron products, electric furnace quality steels, and polyvinyl chloride pipe, announced last week it is entering the market as a seller of steel pipe on a national basis. Its steel pipe is being made immediately available in a wide range of sizes, finishes, and weights in A53 and A120 pipe grades.

Structural Shapes . . .

Structural Shape Prices, Page 157

Following the placing of a substantial volume of structural steel work recently, inquiry has slumped sharply. The decline is partly seasonal, and fabricators' prospects for the immediate future are not promising. Some important pending jobs continue to be held up, but they may come out for bids soon now



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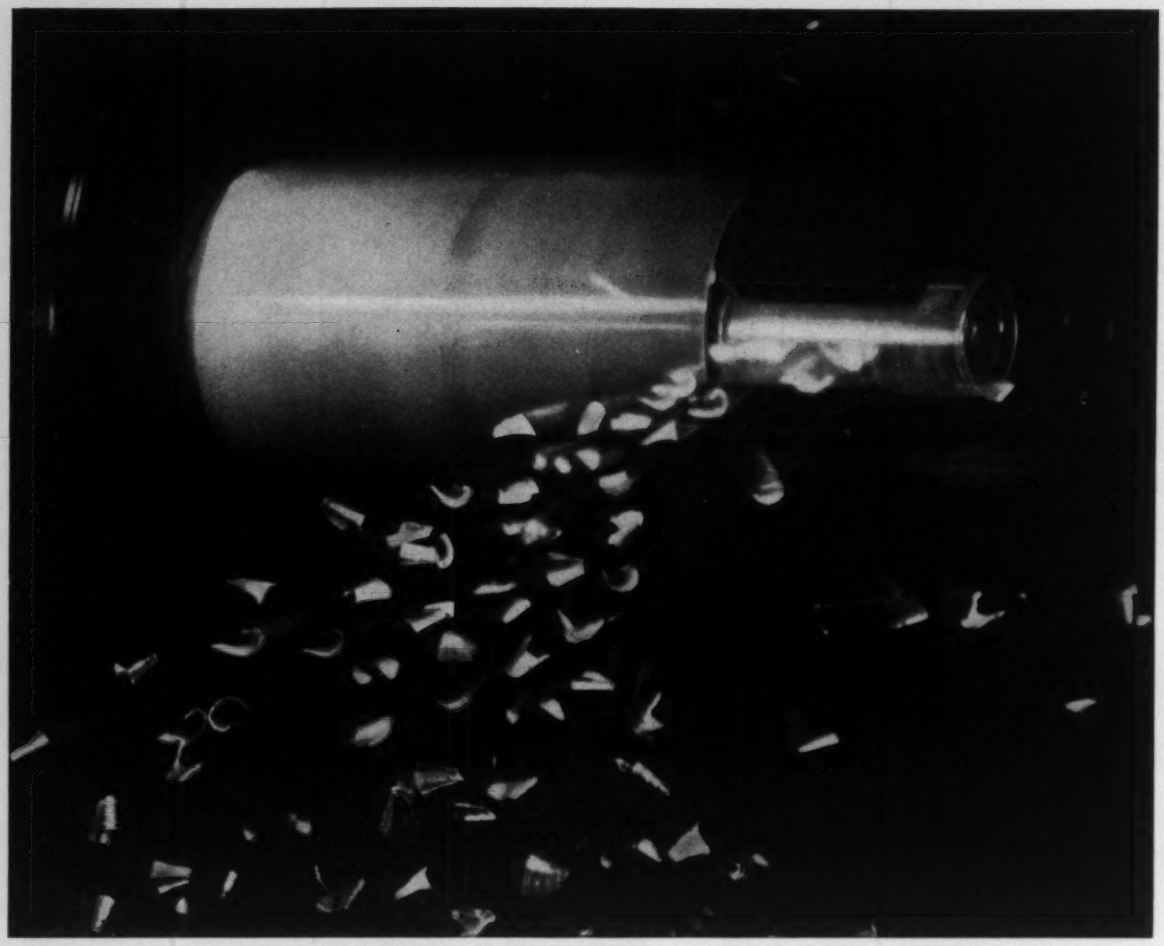

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that the national election is out of the way.

Public work, particularly bridges and highway construction, still dominates demand, although there's a scattering of other types of jobs included in recent awards—for example, 5680 tons for a bank building in New York and 4000 tons for a hotel and office building in Rochester, N. Y. A few fabricators report a better sprinkling of industrial jobs. Seattle's proposed, 12-story city hall is scheduled for bids Dec. 7.

Wide flange beams were in fair demand last month, followed by standard structurals and plates. At Pittsburgh, sales executives say structurals responded mainly to increased demand from the railroad car builders. Shape deliveries still range two to four weeks.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

5680 tons, office, Bankers Trust Co., 280 Park Ave., New York, through Diesel Construction Co., to Bethlehem Steel Co., Bethlehem, Pa.

4000 tons, 18 story hotel and office, Rochester, N. Y., through Diesel Construction Co., New York, to American Bridge Div., U. S. Steel Corp., Pittsburgh.

3000 tons, nylon yarn manufacturing plant, Allied Chemical Co., Irmo, S. C., to Owen Steel Co. through Daniel Construction Co., Greenville, S. C., general contractor.

2963 tons, state bridgework, FARC 50-177, Broome County, New York, through Brunalli Construction Co., general contractor, to American Bridge Div., U. S. Steel Corp., Pittsburgh.

2350 tons, plant, Western Electric Co., Reading, Pa., to Belmont Iron Works, Eddystone, Pa.

900 tons, junior high school, Massapequa, N. Y., through Joseph Bisceglia, general contractor, to August Bellon Iron Works, Long Island, N. Y.

871 tons, 96 steel transmission towers, also footings, government furnished, 21 mile, 230 kv single circuit, Douglas and Chelan Counties, Washington; Pettijohn Engineering Co., Portland, Oreg., low at $270,333 to the Bonneville Power Administration, Portland, Oreg.

435 tons, plant addition, Armstrong Cork Co., at Macon, Ga., to the O'Neal Steel Co., Birmingham.

420 tons, furnace building, Hooker Chemical Co., Columbia, Tenn., to Nashville Bridge Co., Nashville, Tenn.

340 tons, projector plant, Argus Div., Sylvania Electric Products Co., Columbia, S. C., to the Kline Iron & Steel Works, Columbia.

260 tons, radiation laboratory, Brookhaven, N. Y., through Oldfield Construction Co., general contractor, to Bethlehem Steel Co., Bethlehem, Pa.

210 tons, gaseous storage unit, Air Reduction Co., Johnstown, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

180 tons, administration building, Hofstra College, Hempstead, N. Y., through Horn Construction Co., general contractor, to Freeport Iron Works, Freeport, N. Y.

130 tons, pattern shop, Philadelphia Gear Corp., Valley Forge, Pa., to the Robertson Steel Co., Philadelphia.

148 tons, Roosevelt Boulevard bridge, Cape May County, New Jersey, through Ole Hanson, Pleasantville, N. J., general contractor, to American Bridge Div., U. S. Steel Corp., Pittsburgh.

100 tons, 85 ft diameter solar radio telescope antenna, Laurence G. Hanscom Field, Bedford, Mass., to Blaw-Knox Equipment Div., Blaw-Knox Co., Pittsburgh, $310,000.

STRUCTURAL STEEL PENDING

9418 tons, state bridgework, FIGE 60-3, Kings County, New York; new bids asked Dec. 8; no bids submitted at original opening Oct. 20.

3005 tons, New York state bridgework, Oneida County, New York; bids Nov. 17.

2800 tons, South West Freeway, center leg, Washington, D. C.; bids closed.

1671 tons, state bridgework, Cuyahoga and Lake Counties, Ohio, Harry Muller Excavating Co., and Central States Construction Co., Cleveland, low on a joint bid for the general contract.

1500 tons, federal project I-695-6, Baltimore Beltway, Flincote Co., Baltimore, low on the general contract.

1000 tons, New York State University campus, project No. 4, Albany, N. Y.; bids Nov. 16.

600 tons, 3.5 million bushel grain elevator, Port of Kalama, Wash.; Max J. Kuney Co. and E. B. Haynes Co., Spokane, Wash.; joint low at $3,900,000.

551 tons, transmission towers, Missouri River Basin project, Hughes, Mix and Gregory Counties, South Dakota; bids Dec. 7 to the U. S. Engineer, Omaha, Nebr.

160 tons, state bridgework, Route 208, Sec. 2-C, Bergen County, New Jersey; bids Nov. 23; also, 65 tons of reinforcing steel.

100 tons plus, building No. 109, Hanford Works, Washington State; bids in.

100 tons plus, five story steel radar tower, Malmstrom Air Base, Great Falls, Mont.; bids to the U. S. Engineer, Seattle, Dec. 14.

100 tons, booster pump plant, Chief Joseph Dam; bids in to the Bureau of Reclamation, East Wenatchee, Wash.

REINFORCING BARS . . .

REINFORCING BARS PLACED

100 tons, science building, State College, Cheny, Wash., to Union Iron Works, Spokane, Wash.; Max J. Kuney Co., Spokane, general contractor.

100 tons, Aurora Ave. overpass, Seattle, to unstated interest; Mutual Construction Co., Seattle, general contractor at $48,929.

REINFORCING BARS PENDING

3500 tons, two Washington State bridges, Latah Creek, Spokane; general contract to Puget Sound Bridge & Dry Dock Co., Seattle, low at $2,220,201.

330 tons, Chief Joseph Dam pumping plant, East Wenatchee, Wash.; bids in.

285 tons, Air Corps radar tower, Blaine, Wash.; general contract to Baker & Ford, Bellingham, Wash.,

Unstated, Seattle's proposed 12 story city hall and municipal garage; bids Dec. 7.

PLATES . . .

PLATES PLACED

875 tons, medium black, Navy, General Stores Supply Office, Philadelphia, to Colorado Fuel & Iron Corp., Claymont, Del.

850 tons, Seattle, 51 in. water supply line, Beacon Hill; awarded on basis of alternative prestressed concrete, to Frank Coluccio Construction Co., Seattle, low at $385,995.

640 tons, medium black, Navy General Stores Supply Office, Philadelphia, to Phoenix Steel Corp., Harrisburg, Pa.

PLATES PENDING

500 tons or more, 2.4 mile discharge line, with alternatives, Chief Joseph Dam project, East Wenatchee, Wash.; Jensen, Rasmussen & Co., Sunnyside, Wash., and Beck, Seattle, low joint bidders at $1,104,341 to the Bureau of Reclamation, including pump

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plant and 2 million gallon reservoir; Commercial Builders Inc., Moscow, Idaho, low at $1,109,826 for schedule No. 2 specifying all steel discharge line.

100 tons, grain elevator for Port Kalama, Wash.; bids in.

100 tons or more, 10,000 barrel floating roof jet fuel tank, Geiger Air Base, Spokane, Wash.; bids to U. S. Engineer, Seattle, Dec. 8; a $75,000 project.

Unstated, 2700 ft of structural steel piling, also 45 tons of reinforcing, two bridges for Mt. Baker National Park, Washington State; Alfred De Coria, Auburn, Wash., low at $761,990 to the Bureau of Public Roads, Portland, Oreg.

Unstated tonnage, 100,000 gallon elevated water tank, Indian school, Teec Nos Pos, Ariz.; Allen M. Campbell Co., Tyler Tex., general contractor.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Pennsylvania, sixty-six, 4400 hp, electric, freight locomotives, to the Erie, Pa., plant of the General Electric Co.

RAILROAD CARS PLACED

Central of Georgia, 328, fifty ton boxcars to the road's own shops.

Iron Ore . . .

Iron Ore Prices, Page 163

Lake Superior iron ore shipments in October totaled 7,013,603 gross tons vs. 1,096,450 in the like month last year, reports the American Iron Ore Association. Of the total, 6,676,116 tons were moved from U. S. ports, and 337,487 from Canadian.

Shipments for the 1960 season cumulative to Nov. 1 were 67,694,037 tons, up 29,409,979 from the 38,284,058 tons moved in the same period of strike-afflicted 1959.

Stocks of iron ore in the U. S. and Canada (from all sources) at the end of the third quarter totaled 77,794,559 tons vs. 63,344,214 at the end of third quarter, 1959.

Ore consumption in the third quarter amounted to 21,607,131 tons vs. 10,274,809 in the same period last year. Total consumption in the first three quarters this year was 88,248,702 tons against 79,043,219 in the like 1959 period.

Iron Ore Statistics—September, 1960

IRON ORE IN INVENTORY, U. S. AND CANADA—SEPTEMBER, 1960

(Gross tons)

In Inventory at	U. S. Iron Ores L. Sup.	U. S. Iron Ores Other	Canadian Ores L. Sup.	Canadian Ores Other	Foreign Ores	Total
Furnace Yards						
Start of Month	37,146,362	3,726,486	1,818,948	5,178,958	15,081,862	62,952,616
End of Month in:						
Mass., New York	3,632,112	39,254	63,377	246,828	321,691	4,303,262
Pennsylvania	8,441,272	419,658	33,873	182,438	7,500,155	16,577,396
Md., Va., W. Va.	446,501	2,747	.....	2,343,753	2,585,796	5,378,797
Ky., Tenn., Tex.	381,497	211,280	.....	387,921	123,471	1,104,169
Alabama	871	1,854,530	.....	127,075	3,415,009	5,397,485
Ohio	10,676,541	38,290	836,700	1,998,052	1,077,953	14,627,536
Indiana	8,103,179	23,520	570,571	1,671	56,760	8,755,701
Illinois	5,456,795	44,599	58,481	.....	243,433	5,803,308
Mich., Minn.	3,721,228	.....	451,655	122,082	357,898	4,652,863
Colo., Utah, Calif.	.....	1,018,286	.....	.....	23,415	1,041,701
Undistributed	90	2,657	.....	.....	232	2,979
End of Month total	40,860,086	3,654,821	2,014,657	5,409,820	15,705,813	67,645,197
At U. S. Docks	3,397,272	.....	186,470	904,536	1,996,178	6,484,456
Total U. S. Stocks	44,257,358	3,654,821	2,201,127	6,314,356	17,701,991	74,129,653
At Canada Furnaces						
Start of Month	2,466,692	.....	163,351	394,866	51,095	3,076,004
End of Month	2,973,220	.....	172,799	475,983	42,904	3,664,906
Total U. S. & Canada	47,230,578	3,654,821	2,373,926	6,790,339	17,744,895	77,794,559

IRON ORE CONSUMPTION, U. S. AND CANADA—SEPTEMBER, 1960

(Gross tons)

In U. S.:	U. S. Iron Ores L. Sup.	U. S. Iron Ores Other	Canadian Ores L. Sup.	Canadian Ores Other	Foreign Ores	Total
Mass., New York	331,449	527	13,453	6,756	14,673	366,858
Pennsylvania	562,431	130,857	5,095	30,120	484,029	1,212,532
Md., Va., W. Va.	84,313	17,829	.....	242,102	293,002	637,246
Ky., Tenn., Tex.	50,378	46,987	.....	47,386	26,696	171,447
Alabama	.....	289,371	.....	1,339	125,069	415,779
Ohio	748,518	28,906	36,887	107,938	125,390	1,047,639
Indiana	839,367	6,573	85,679	11,147	8,147	950,913
Illinois	462,461	20,779	8,063	.....	39,584	530,887
Mich., Minn.	426,037	.....	63,643	14,088	47,930	551,698
Colo., Utah, Calif.	.....	464,673	.....	.....	6,172	470,845
Undistributed	122	40	.....	.....	12	174
In U. S.:						
Blast furnaces	2,225,252	556,110	111,445	187,444	479,811	3,560,062
Steel furnaces	73,599	43,032	13,493	8,979	290,228	429,331
Sintering	1,206,188	394,985	87,882	264,453	400,665	2,354,173
Miscellaneous	37	12,415	.....	.....	.....	12,452
Total U. S.	3,505,076	1,006,542	212,820	460,876	1,170,704	6,356,018
In Canada:						
Blast furnaces	224,757	.....	79,446	78,053	1,704	383,960
Steel furnaces	.....	.....	.....	18,707	6,487	25,194
Sintering	70,344	.....	8,678	28,000	.....	107,022
Miscellaneous	18	.....	.....	.....	.....	18
Total Canada	295,119	.....	88,124	124,760	8,191	516,194
Total U. S. & Canada	3,800,195	1,006,542	300,944	585,636	1,178,895	6,872,212

Data supplied by American Iron Ore Association, Cleveland.

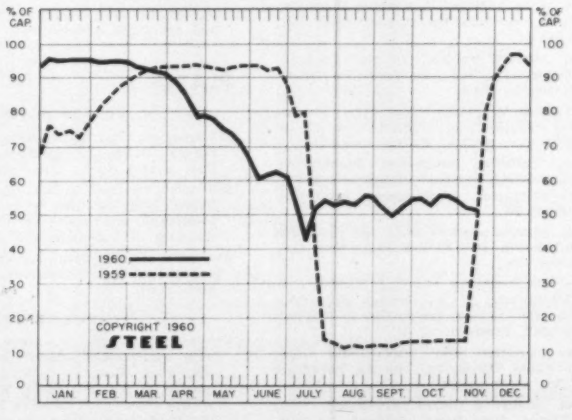
DISTRICT INGOT RATES

(Percentage of capacity utilized)

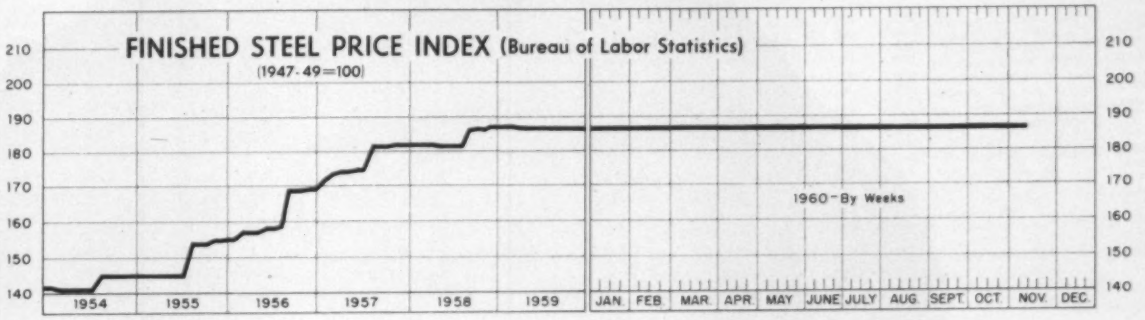
	Week Ended Nov. 13	Week Ago	Month Ago	Year Ago
Northeastern	56	54	62	51
Buffalo	53	59	56	45
Pittsburgh	47	48	46	44
Youngstown	39	42	46	40
Cleveland	57	59	56	41
Detroit	69	64	69	46
Chicago	51	52	60	42
Cincinnati	55	58	62	66
St. Louis	74	73	78	92
Southern	53	52	51	31
Western	47	46	56	44
Total Industry	51.4	51.9	55.4	45.6
Index (1947-49=100)	91.1	92.0	98.3	80.4
Net Tons (In thousands)	1,464	1,478	1,579	1,291

Current week's figures are preliminary. Weekly capacity (net tons): 2,849,306 in 1960 and 2,831,331 in 1959. Source: American Iron & Steel Institute.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Nov. 8, 1960	Week Ago	Month Ago	Oct. Index	Year Ago
186.2	186.2	186.2	186.2	186.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Nov. 8

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 In. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloys, High Speed, W18, Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	6.335
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.775
Sheets, C.R., Stainless, 302 (lb)	0.658
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.489
Strip, C.R., Stainless, 430 (lb)	0.480
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.495
Pipe, Galv., Buttweld (100 ft)	23.098
Pipe, Line (100 ft)	195.430
Casing, Oil Well, Carbon (100 ft)	201.080
Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	194.268
Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (bundles)	7.647
Nails, Wire, 8d Common	9.433
Wire, Barbed (80-rod spool)	8.414
Woven Wire Fence (20-rod roll)	21.003

STEEL's FINISHED STEEL PRICE INDEX

	Nov. 9 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	208.90
Index in cents per lb	6.713	6.713	6.713	6.713	5.659

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$128.14
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	58.99
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	58.49
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	59.77
Steelmaking Scrap, GT	28.83	29.00*	30.17	45.33	45.33

*Revised.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Nov. 9 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.97	5.97	5.965	5.975	4.90
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.90
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.745	5.745	5.74	5.77	4.88
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.80
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.80
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.25
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.35
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.25
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.45

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, 7/32-5/8" Pitts.	6.40	6.40	6.40	6.40	5.025

PIG IRON, Gross Ton	Nov. 9 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$59.50
Basic, Valley	66.00	66.00	66.00	66.00	58.50
Basic, deld., Philadelphia	70.18	70.18	70.07	70.41	62.16
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, deld., Phila.	70.68	70.68	70.57	70.91	62.66
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	59.00
Malleable, Chicago	66.50	66.50	66.50	66.50	59.00
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$26.50	$26.50	$28.50	$45.50	$44.50
No. 1 Heavy Melt, E. Pa.	34.00	34.00	34.00	45.00	47.00
No. 1 Heavy Melt, Chicago	26.00	26.50*	28.00	45.50	44.50
No. 1 Heavy Melt, Valley	26.50	26.50	28.50	44.50	48.00
No. 1 Heavy Melt, Cleve.	23.50	23.50	26.50	41.50	45.50
No. 1 Heavy Melt, Buffalo	23.50	25.50	27.50	33.50	43.50
Rails, Rerolling, Chicago	46.50	46.50	49.50	64.50	65.50
No. 1 Cast, Chicago	36.50	36.50	36.50	57.50	47.50

*Revised.

COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.00	$13.625
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	26.25

Can you understand this man's hunger for Tools?

Without them he's useless—a burden to himself and the earth. ■ With tools in his hands—a spade, a hoe, a trowel, a rake—he could raise food enough for his own family and perhaps other hungry villagers. ■ But for this man and countless others like him in Greece, in India, in Latin America and other desperately poor areas—the simplest steel implements are beyond reach. They cost too much. So millions of acres are barely scratched...with forked sticks or wooden ploughs...and two-thirds of the world's people still go to sleep hungry. ■ Will you help them till the fertile earth...through CARE? Wherever possible, CARE food distribution is coupled with a tools-for training program that enables men and women to become self-supporting. The need was never greater, the rewards never richer. ■ *Will you buy an extra tool*—to put into hands hungry for work, food, and dignity? ■ Send dollars to CARE, New York 16.

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(Space donated by this publication)

Steel Prices

Mill prices as reported to STEEL, Nov. 9, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 158; footnotes, page 160.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)
Detroit S41 .....$82.00
Economy,Pa. B14 .....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS Carbon Rerolling (NT)
Bartonville,Ill. K4 ...$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa.A3..104.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 ....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14..99.50
S.Duquesne,Pa. U5 ...99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$119.00
Bridgeport,Conn. C32. .119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 .....119.00
Conshohocken,Pa. A3 .126.00
Detroit S41 .....119.00
Economy,Pa. B14 .....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ...119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ....119.00
Seattle(6) B3 .....140.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14.119.00
S.Duquesne,Pa. U5 ..119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2,W14.122.50
S.Duquesne,Pa. U5 ...122.50
Warren,O. C17 .....122.50

SKELP
Aliquippa,Pa. J5 .....5.05
Benwood,W.Va. W10 ....5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 .....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Col. C10 ....6.65
Monessen,Pa. P7 .....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ....5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14 .5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 .....5.50

Wide Flange
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 .....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N15 .....5.50
Weirton,W.Va. W6 .....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ...8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 .....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 .....8.05
Lackawanna,N.Y. B2 ...8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ...6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2 U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ...5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. P4 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 .....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1 .5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ...5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14 ..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. P4 .....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah, C11 .....7.05
Houston S5 .....7.15
Johnstown, Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa B14 .....14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. P4 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ...7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1.7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Sterling,Ill. N15 .....7.625
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 .....7.50
Claymont,Del. P4 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 .....7.50

FLOOR PLATES
Cleveland J5 .....6.375
Conshohocken,Pa. A3 ..6.375
Harrisburg,Pa. P4 .....6.375
Ind.Harbor,Ind. I-2 ....6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ...5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R2 .....6.05
Warren,O. R2 .....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ....5.675
Aliquippa,Pa. (9) J5 ...5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer, Ala.(9) T2 ..5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 .....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ...6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle(9) A24,B3,N15 .6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 .....5.675
Tonawanda,N.Y. B12 ...5.675
Torrance,Calif.(9) C11 .6.375
Warren,O. C17 .....6.025
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ..6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 .....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ...6.725
LosAngles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Seattle(6) B3 .....7.825
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ...8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 .....9.05
Sterling,Ill. N15 .....7.925
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
SterlingIll. N15 .....5.775
Sterling,Ill.(1) N15 ....5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
Seattle B3 .....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy,Pa. B14 .....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Leaded (Including leaded extra) Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ..10.175
BeaverFalls,Pa. M12 ..10.175
Camden,N.J. P13 .....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 .....10.35
SpringCity,Pa. K3 .....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2.7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ..7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2..7.65
Hartford,Conn. R2 .....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
Seattle(49) S30 .....9.10
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19.6.55

BARS, Cold-finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa.M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 .....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. B5 .....9.025
Lackawanna,N.Y. B3..9.025
LosAngeles P2, S30 ....11.00
Mansfield,Mass. B5 ....9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 ....9.20

Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.25
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex.(26) T4 ..5.50
Gary,Ind. U5 .....5.675
Houston S5 .....5.675
Ind.Harbor,Ind. I-2,Y1.5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ...5.675
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2...5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ...6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SandSprings,Okla. S5 ..5.675
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill.(1) N15 ...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.35
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.35
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ...7.35
Seattle A24, B3, N14 ..7.95
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ..7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt) B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.)L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ....5.575
Franklin,Pa.(4) F5 ....5.675
JerseyShore,Pa.(3) J8 .5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3, ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19Ga. & Lighter)

Niles,O. M21, S3 ....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(38) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 ....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ...9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 ....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ...8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

Follansbee,W.Va. W10 .7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ...7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Well Casing

Fontana,Calif. K1 .....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 ....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 U .S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala. City, Ala. (27) R2 ...5.10
Allenport, Pa. P7 .....5.10
Alton, Ill. L1 .....5.30
Ashland, Ky. (8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer, Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken, Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse, Mich. G5 .....5.10
Fairfield, Ala. T2 .....5.10
Farrell, Pa. S3 .....5.10
Fontana, Calif. K1 ....5.825
Gary, Ind. U5 .....5.10
Ind. Harbor, Ind. I-2, Y1..5.10
Johnstown, Pa. (25) B2...5.10
Lackaw'na, N.Y. (25) B2.5.10
LosAngeles (25) B3 .....5.85
LosAngeles C1 .....8.60
Minnequa, Colo. C10 ....6.20
Riverdale, Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle (25) B3 .....6.10
Seattle N14 .....6.60
Sharon, Pa. S3 .....5.10
S. Chicago, Ill. W14 ....5.10
S. SanFrancisco (25) B3 ..5.85
SparrowsPoint, Md. B2 ..5.10
Torrance, Calif. C11 ....5.85
Warren, O. R2 .....5.10
Weirton, W. Va. W6 ....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie, Pa. S18 .....8.40
Farrell, Pa. S3 .....8.40
Gary, Ind. U5 .....8.40
Houston S5 .....8.65
Ind. Harbor, Ind. Y1 .....8.40
KansasCity, Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville, O. S3 .....8.40
Newport, Ky. A2 .....8.40
Sharon, Pa. A2, S3 ....8.40
S. Chicago, Ill. W14 ....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland, Ky. A10 .....7.575
Bessemer, Ala. T2 .....7.575
Conshohocken, Pa. A3 ..7.575
Ecorse, Mich. G5 .....7.575
Fairfield, Ala. T2 .....7.575
Farrell, Pa. S3 .....7.575
Gary, Ind. U5 .....7.575
Ind. Harbor, Ind. I-2, Y1 7.575
Lackawanna, N.Y. B2 ..7.575
LosAngeles (25) B3 ....8.325
Seattle (25) B3 .....8.575
Sharon, Pa. S3 .....7.575
S. Chicago, Ill. W14 ....7.575
S. SanFrancisco (25) B3..8.325
SparrowsPoint, Md. B2 ..7.575
Warren, O. R2 .....7.575
Weirton, W. Va. W6 ....7.575
Youngstown U5, Y1 ....7.575

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10 ....5.35
Warren, O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson, Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 .....7.425
Dearborn, Mich. S3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover, O. G6 .....7.425
Evanston, Ill. M22 ....7.525
Farrell, Pa. S3 .....7.425
Follansbee, W. Va. W10 .7.425
Fontana, Calif. K1 ....9.20
FranklinPark, Ill. T6 ..7.525
Ind Harbor, Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport, Pa. E10 ..7.525
NewBedford, Mass. R10..7.875
NewBritain, Conn. S15 ..7.875
NewCastle, Pa. B4, M23 7.425
NewHaven, Conn. D2 ..7.875
NewKensington, Pa. A6..7.425
Pawtucket, R.I. R3, N8..7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale, Ill. A1 .....7.525
Rome, N.Y. (32) R6 ....7.425
Sharon, Pa. S3 .....7.425
Trenton, N.J. (31) R5 ..8.875
Warren, O. R2, T5 ....7.425
Worcester, Mass. A7 ...7.975

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Cleveland A7 .....15.55
Carnegie, Pa. S18 .....15.55
Dover, O. G6 .....15.55
Farrell, Pa. S3 .....15.55
FranklinPark, Ill. T6 ..15.55
Harrison, N.J. S18 .....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville, O. S3 .....15.55
Pawtucket, R.I. N8 ....15.90
Riverdale, Ill. A1 .....15.55
Sharon, Pa. S3 .....15.55
Worcester, Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn, Mich. S3 ....10.80
Dover, O. G6 .....10.80
Farrell, Pa. S3 .....10.80
Ind. Harbor, Ind. Y1 ....10.80
Sharon, Pa. S3 .....10.80
Warren, O. R2 .....10.80
Weirton, W. Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2 .....8.175

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson, Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie, Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn, Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover, O. G6	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. M22	9.05	10.40	12.60	15.60	....
Farrell, Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria, O. S1	10.05	10.40	12.60	15.60	....
FranklinPark, Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison, N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain, Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle, Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven, Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington, Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket, R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome, N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon, Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton, N.J. R5	....	10.70	12.90	15.90	18.85
Warren, O. T5	8.95	10.40	12.60	15.60	18.55
Worcester, Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol, Conn. W1	...	...	18.85	22.95	27.80
Buffalo W12	...	...	18.85	....	....
Fostoria, O. S1	...	...	19.05	22.15	....
FranklinPark, Ill. T6	...	...	19.20	23.30	28.15
Harrison, N.J. C18	...	...	18.85	22.95	27.80
NewYork W3	...	...	18.85	22.95	27.80
Palmer, Mass. W12	...	...	18.85	....	....
Trenton, N.J. R5	...	...	18.85	22.95	27.80
Worcester, Mass. A7, T6	...	...	18.85	22.95	27.80
Youngstown S41	...	...	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover, O. G6 .....7.425*
Evanston, Ill. M22 ....7.525*
McKeesport, Pa. E10 ...7.50*
NewCastle, Pa. M23 ..7.425*
Riverdale, Ill. A1 ....7.525*
Warren, O. B9, S3, T5.7.425*
Worcester, Mass. A7 ...7.975
Youngstown S41, Y1 .7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell, Pa. S3 .....7.50
Sharon, Pa. S3 .....7.50

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell, Pa. S3 .....5.525
Riverdale, Ill. A1 .....5.675
Sharon, Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$9.10	$9.35	$9.75
Fairfield, Ala. T2	9.20	9.45	9.85
Fairless, Pa. U5	9.20	9.45	9.85
Fontana, Calif. K1	9.75	10.00	10.40
Gary, Ind. U5	9.10	9.35	9.75
GraniteCity, Ill. G4	9.20	9.45	9.85
IndianaHarbor, Ind. I-2, Y1	9.10	9.35	9.75
Irvin, Pa. U5	9.10	9.35	9.75
Niles, O. R2	9.10	9.35	9.75
Pittsburg, Calif. C11	9.75	10.00	10.40
SparrowsPoint, Md. B2	9.10	9.35	9.75
Weirton, W. Va. W6	9.10	9.35	9.75
Yorkville, O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa, Pa. J5 (21-27 Ga.)	....	7.90	8.10	....
IndianaHarbor, Ind. Y1 (20-27 Ga.)	....	7.90	....	....
Niles, O. R2 (20-27 Ga.)	....	7.90	8.10	8.30

ELECTROLYTIC THIN TIN PLATE (FERROLITE) 1/4 lb coating in coils)

Common Coke	lb	lb	Base Box 45 lb	50 lb	55 lb	60 lb
Fairfield, Ala. T2			$6.20	$6.35	$6.50	$6.65
Fairless, Pa. U5			6.20	6.35	6.50	6.65
Gary, Ind. U5			6.10	6.25	6.40	6.55
Irvin, Pa. U5			6.10	6.25	6.40	6.55

TIN PLATE, Hot Dipped 1.25 1.50

Common Coke	lb	lb
Aliquippa, Pa. J5	$10.40	$10.65
Fairfield, Ala. T2	10.50	10.75
Fontana, Calif. K1	11.05	11.30
Gary, Ind. U5	10.40	10.65
Irvin, Pa. U5	10.40	10.65
Pitts., Calif. C11	11.05	11.30
Sp. Pt. Md. B2	10.40	10.65
Weirton, W. Va. W6	10.40	10.65
Yorkville, O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa, Pa. J5 .....$8.20
Fairfield, Ala. T2 .....8.30
Fairless, Pa. U5 .....8.30
Fontana, Calif. K1 .....8.85
Gary, Ind. U5 .....8.20
GraniteCity, Ill. G4 ....8.30
Ind. Harbor, Ind. I-2, Y1..8.20
Irvin, Pa. U5 .....8.20
Niles, O. R2 .....8.20
Pittsburg, Calif. C11 ....8.85
SparrowsPoint, Md. B2 ..8.20
Weirton, W. Va. W6 ....8.20
Yorkville, O. W10 .....8.20

HOLLOWARE ENAMELING (Black Plate) (29 Gage)

Aliquippa, Pa. J5 .....7.85
Gary, Ind. U5 .....7.85
GraniteCity, Ill. G4 ....7.95
Ind. Harbor, Ind. Y1 ....7.85
Irvin, Pa. U5 .....7.85
Yorkville, O. W10 .....7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed 1/2c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom, W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge, Pa. A4	....	....	12.40	13.55	14.65
GraniteCity, Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor, Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield, O. E6	9.875*	11.70	12.40	13.55	14.65
Newport, Ky. A2	9.875*	11.70†	12.40†	13.55*	14.65*
Niles, O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift, Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren, O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville, O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift, Pa. U5	8.10
Mansfield, O. E6	8.10
Warren, O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed 1/2c lower)	T-72	T-65	T-58	T-52
BeechBottom, W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift, Pa. U5	15.70	16.30	16.80	17.85
Zanesville, O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	T-100	Grain Oriented T-90	T-80	T-72	T-66	T-72
Brackenridge, Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler, Pa. A10	....	....	....	19.70	20.20	20.70	....
Vandergrift, Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren, O. R2	....	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed 1/2c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity, Ala. R2 ...8.00
Aliquippa, Pa. J5 .....8.00
Alton, Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville, Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 .....8.00
Crawfordsville, Ind. M8..8.10
Donora, Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield, Ala. T2 .....8.00
Fostoria, O. (24) S1 ....8.10
Houston S5 .....8.25
Jacksonville, Fla. M8 ....8.35
Johnstown, Pa. B2 .....8.00
Joliet, Ill. A7 .....8.00
KansasCity, Mo. S5 ....8.25
Kokomo, Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa, Colo. C10 ....8.25
Monessen, Pa. P7, P16...8.00
Palmer, Mass. W12 .....8.30
Pittsburg, Calif. C11 ....8.95
Portsmouth, O. P12 ....8.00
Rankin, Pa. A7 .....8.00
S. Chicago, Ill. R2 .....8.00
S. SanFrancisco C10 ....8.95
SparrowsPoint, Md. B2 ..8.10
Sterling, Ill. (1) N15 ....8.00
Sterling, Ill. N15 .....8.10
Struthers, O. Y1 .....8.00
Waukegan, Ill. A7 .....8.00
Worcester, Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria, O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville, Ill. K4 .....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora, Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown, Pa. B2 ....13.40
KansasCity, Mo. U3 ...12.90
Minnequa, Colo. C10 ..12.775
Monessen, Pa. P7, P16..12.65
Muncie, Ind. I-7 .....13.60
NewHaven, Conn. A7 ...12.95
Palmer, Mass. W12 ....13.70
Pittsburg, Calif. C11 ...13.45
Portsmouth, O. P12 ....12.65
Roebling, N.J. R5 .....12.95
SparrowsPt., Md. B2 ...13.50
Struthers, O. Y1 .....13.40
Trenton, N.J. A7 .....12.95
Waukegan, Ill. A7 .....12.65
Worcester, Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa, Pa. J5 .....9.75
Alton, Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora, Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown, Pa. B2 .....9.75
KansasCity, Mo. S5, U3..10.00
Kokomo, Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa, Colo. C10 ....9.95
Monessen, Pa. P7, P16 ..9.75
NewHaven, Conn. A7 ..10.05
Palmer, Mass. W12 ....10.05
Pittsburg, Calif. C11 ...10.70
Portsmouth, O. P12 ....9.75
Roebling, N.J. R5 .....10.05
S. Chicago, Ill. R2 .....9.75
S. SanFrancisco C10 ...10.70
SparrowsPt., Md. B2 ....9.85
Struthers, O. Y1 .....9.75
Waukegan, Ill. A7 .....9.75
Worcester, Mass. A7 ....10.05

WIRE, MB Spring, High-Carbon

Aliquippa, Pa. J5 .....9.75
Alton, Ill. L1 .....9.95
Bartonville, Ill. K4 .....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora, Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria, O. S1 .....9.80
Johnstown, Pa. B2 .....9.75
KansasCity, Mo. S5, U3..10.00
LosAngeles B3 .....10.70
Milbury, Mass. (12) N6 .10.05
Minnequa, Colo. C10 ....9.95
Monessen, Pa. P7, P16..9.75
Muncie, Ind. I-7 .....9.95
Palmer, Mass. W12 ....10.05
Pittsburg, Calif. C11 ...10.70
Portsmouth, O. P12 ....9.75
Roebling, N.J. R5 .....10.05
S. Chicago, Ill. R2 .....9.75
S. SanFrancisco C10 ....10.70
SparrowsPt., Md. B2 ....9.85
Struthers, O. Y1 .....9.75
Trenton, N.J. A7 .....10.05
Waukegan, Ill. A7 .....9.75
Wor'ster, Mass. A7, J4, T6 10.05

WIRE, Fine & Weaving (8" Coils)

Alton, Ill. L1 .....16.50
Bartonville, Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville, Ind. M8..16.40
Fostoria, O. S1 .....16.30
Houston S5 .....16.55
Jacksonville, Fla. M8 ...16.65
Johnstown, Pa. B2 .....16.30
KansasCity, Mo. S5 ....16.55
Kokomo, Ind. C16 .....16.30
Minnequa, Colo. C16 ....16.55
Monessen, Pa. P16 .....16.30
Muncie, Ind. I-7 .....16.50
Palmer, Mass. W12 .....16.60
S. SanFrancisco C10 ...17.15
Waukegan, Ill. A7 .....16.30
Worcester, Mass. A7, J6..16.60

ROPE WIRE (A)

Bartonville, Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria, O. S1 .....13.45
Johnstown, Pa. B2 .....13.45
Monessen, Pa. P7 .....13.45
Muncie, Ind. I-7 .....13.65
Palmer, Mass. W12 .....13.75
Portsmouth, O. P12 ....13.45
Roebling, N.J. R5 .....13.75
St. Louis L8 .....13.45
SparrowsPt., Md. B2 ....13.55
Struthers, O. Y1 .....13.45
Worcester, Mass. J4 .....13.75
(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock Sizes — Col.

AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, CUT (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES — Col.

AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	10.51
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	8.88
LosAngeles B3	9.44
Minnequa,Colo. C10	9.02
Pittsburg,Calif. C11	9.44
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	10.85
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.16
LosAngeles B3	9.75
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.75
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	10.90
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	10.96
Kokomo,Ind. C16	9.21
LosAngeles B3	9.80
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.80
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop — Col.

AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS — Col.

Birmingham C15	177
Chicago Hts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed — Col.

AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WIRE (16 gage) — An'ld Galv. Stone — An'ld Galv. Stone

Ala.City,Ala.R2	17.85 19.40**
Ali'ppa,Pa. J5	17.85 19.65
Bartonville K4	17.95 19.80
Chicago W13	17.85
Cleveland A7	17.85
Craw'sville M8	17.95 19.80‡‡
Fostoria,O. S1	18.35 19.90†
Houston S5	18.10 19.65**
Jacksonville M8	18.95 19.80‡‡
Johnstown B2	17.85 19.65§
Kan.City,Mo. S5	18.10
Kokomo C16	17.95 19.50†
Minnequa C10	18.10 19.65**
P'lm'r,Mass.W12	18.15 19.70†
Pitts.,Calif. C11	18.20 19.75†
S.SanFran. C10	18.20 19.75**
St'ling(37) N15	17.95 19.80
SparrowsPt. B2	17.95 19.75§
Waukegan A7	17.85 19.40†
Worcester A7	18.15

WOVEN FENCE, 9-15 Ga. — Col.

Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A1	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality (6 to 8 gage) — An'ld Galv.

Ala.City,Ala. R2	9.00 9.55**
Aliquippa J5	8.65 9.325§
Atlanta(48) A11	9.00 9.75*
Bartonville(48) K4	9.85 19.90
Buffalo W12	9.00 9.55†
Chicago W13	9.00 9.55**
Cleveland A7	9.00
Crawfordsville M8	9.10 9.80††
Donora,Pa. A7	9.00 9.55†
Duluth A7	9.00 9.55†
Fairfield T2	9.00 9.55†
Houston(48) S5	9.25 9.80**
Jack'ville,Fla. M8	9.10 9.80‡‡
Johnstown(48) B2	9.00 9.675§
Joliet,Ill. A7	9.00 9.55†
KansasCity(48)S5	9.25 9.80**
Kokomo(48) S16	9.10 9.65†
LosAngeles B3	9.95 10.625§
Minnequa C10	9.25 9.80**
Monessen(48) P7	8.65 9.35§
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	9.95 10.50†
Rankin,Pa. A7	9.00 9.55†
S.Chicago R2	9.00 9.55**
S.SanFran. C10	9.95 10.50**
Spar wsPt.(48)B2	9.10 9.775§
St'ling(37)(48)N15	9.10 9.80
Struthers,O. Y1	9.00 9.65‡
Worcester,Mass.A7	9.30 9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great. Structural ½ in., larger 12.85. ⅞ in. and smaller by 6 in. and shorter: 15% off list.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nut 1¼ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only — for package or bulk quantities use applicable list less bulk discounts.

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packaged	+55
Bulk	+16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:	
Packaged	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:	
Packaged	+ 5
Bulk	19
Through 1 in. diam., longer than 6 in.:	
Packaged	+29

HEXAGON NUTS, American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches 1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St. Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 3 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(12) Worcester, Mass., base.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.65c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2½ in. and smaller hexagons; 9.65c for larger rounds and hexagons and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling—Ingot	Rerolling—Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	H.R. Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	52.00
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	59.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	80.75
316L	....	56.25	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	65.50
330	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates: 5% Carbon Base	10%	15%	20%	Sheets: 20% Carbon Base
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled—	
Copper*	36.35	43.40

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.435
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.41	75.91	....
Newark, N.J., deld	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Other U. S. Districts				
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
Sault Ste. Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 14½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Los Angeles, and San Francisco, 10,000 lb. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS				STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	7.77	8.66	10.06	....	8.28	8.55	11.80	16.38	9.03	8.34	10.02
Birmingham	9.43	10.20	10.46	....	10.41	8.26	13.14	16.76	8.47	8.41	10.05
Boston	9.67	10.58	11.77	53.50	12.16	9.77	13.35	16.59	10.16	9.62	11.08
Buffalo	8.65	9.80	11.25	55.98	11.00	8.75	11.45	16.30	9.15	8.65	11.10
Charlotte, N. C.	9.87	11.22	10.30	....	10.86	9.67	12.68	....	9.88	9.82	11.46
Chicago	8.57	10.20	10.15	52.00	10.74	8.55	10.65	15.95	8.91	8.41	10.68
Cincinnati	8.74	10.26	10.20	65.30	11.06	8.87	11.53	16.27	9.47	8.79	11.01
Cleveland	8.57	9.88	11.24	56.18	10.86	8.66	11.25	16.06	9.30	8.65	10.92
Dallas	9.62	10.05	12.59	....	11.18	9.03	12.98	16.95	9.26	9.35	11.00
Detroit	8.83	10.46	10.50	52.00	11.11	8.86	11.01	16.23	9.47	8.78	10.94
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	9.22	9.65	12.19	52.00	10.78	8.63	13.10	16.55	8.86	8.95	10.60
Indianapolis	9.01	10.64	10.59	....	11.18	8.99	11.09	16.39	9.35	8.85	11.12
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	8.95	11.20	11.45	61.27	10.65	9.00	14.20	17.35	9.90	8.40	11.15
Memphis, Tenn.	9.84	10.05	....	....	10.64	9.82	12.74	....	9.16	8.66	11.41
Milwaukee	8.71	10.34	10.29	....	10.88	8.69	10.89	16.09	9.13	8.55	10.82
Moline, Ill.	8.92	10.55	10.50	....	10.90	8.90	11.15	16.45	9.26	8.76	10.96
Newark, N. J.	9.36	10.13	11.35	....	11.46	9.74	13.25	16.40	10.20	9.51	11.05
New York	9.36	10.13	11.35	52.98	11.46	9.74	13.25	16.40	10.20	9.51	11.05
Philadelphia	8.35	9.60	10.66	52.71	10.35	8.75	11.95	16.38	8.95	8.70	9.95
Pittsburgh	8.57	9.88	11.13	52.00	10.84	8.55	11.25	15.95	8.91	8.41	10.68
Portland, Oreg.	9.45	11.30	12.35	....	11.45	9.45	16.65	17.80	10.05	9.60	11.75
St. Louis	8.77	10.58	10.53	....	10.94	8.77	11.28	16.33	9.14	8.62	10.91
St. Paul	8.84	9.59	10.84	....	11.01	8.82	11.49	16.54	9.18	8.68	10.44
San Francisco	10.17	11.69	11.40	54.00	11.78	10.07	15.10	17.25	10.49	10.38	12.47
Seattle	10.51	11.57	12.50	54.02	11.95	9.94	16.20	17.80	10.65	10.10	12.73
Spokane, Wash.	10.36	11.42	12.35	54.02	11.80	9.79	16.20	17.80	10.50	9.95	12.58

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 & 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; stainless, 16 Ga. & 36 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ¾ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $148; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Clayburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa.; Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Aisey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Vandalia, Mo., New Salisbury, Ohio, $97; Vanport, Pa., Wellsville, Irondale, Ohio, $100; Clearfield, Pa., Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $250; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines; Chewelah, Wash., Luning, Nev., $46; ¾ in. grains with fines: Baltimore (periclase), $73; Pascagoula, Miss. (periclase), $90.

*—9 in. x 4½ x 2.50 straights.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam	Length	Per 100 lb
——Inches——		
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Canadian Steel

(Cents per pound, f.o.b. mill, except as otherwise noted.)

Billets, Blooms & Slabs:

Carbon forging (N.T.) $97.00
Carbon rerolling (N.T.) 78.00
Alloy (N.T.) 115.00

Wire Rods:

Carbon 5.70
Alloy 6.40

Wire (carload lots):

Merchant annealed . 8.40
Low carbon indus. . 7.20
Upholstery spring .. 8.55
M.B. spring 8.85

Bars & Small Shapes:

Carbon, merchant .. 5.30
Carbon, special 5.85
Alloy 6.40

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75

(In contract lots of 750 tons price is 22.75c.)

	Dollars
Annealed, 99.5% Fe, ton, del. east of Mississippi.	36.75
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh) .	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 600-lb drum freight allowed, c.l. 39.80; ton lots 41.80	
Brass, 80/20, leaded (60 mesh)	37.60
Bronze powder, 90/10	55.20
Copper, all types	15.25*
Lead	7.50*
Manganese, minus 35 mesh	1.00
Nickel, all types .	0.78-1.06
Nickel-Silver	58.80
Solder	8.00*
Stainless Steel, 304 ..	89.00
Stainless Steel, 316 ..	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	24.70

	Dollars
Cobalt: 98.5%, minus 100-300 mesh...	1.57-1.58
99.5%, below 5 microns	2.32
Tungsten: Carbon and hydrogen reduced, 98.8% min., minus 65 mesh	nom.**
Molybdenum	4.35

*Plus cost of metal. †Depending on mesh. ‡Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Ores

Lake Superior Iron Ore

(Prices effective for the 1960 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Lump ½ in. and up	12.55
Fines, under ½ in.	10.72
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1960; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates ..... nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	23.00†
Chilean, 62-65%, c.i.f. Atlantic ports ..	22.00
Brazilian, 68.5% f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$19.75-20.00*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charlestown, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†
South African Transvaal	
44% no ratio	18.75†
48% no ratio	24.00-26.00†
Turkish	
48% 3:1	36.00-37.00†
Domestic	
Rail nearest seller	
18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
55-60%	$2.50-2.80
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic 31.00

*Before duty. †Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.35
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per net ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes*	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305 ...	$5.42	....	$5.32	$5.17	$5.52
Bar Size Angles	5.55	....	5.45	5.30	5.65
Structural Angles	5.45	....	5.35	5.20	5.55
I-Beams	5.45	....	5.35	5.20	5.55
Channels	5.45	....	5.35	5.20	5.55
Plates(basic bessemer)	5.70	....	5.60	5.45	5.80
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.50	....	24.70	24.70	25.50
Barbed Wire (†)	6.25	....	6.15	6.00	6.35
Merchant Bars	5.55	....	5.45	5.30	5.65
Hot-Rolled Bands	5.85	....	5.75	5.60	5.95
Wire Rods, Thomas Commercial No. 5	6.05	....	5.95	5.95	6.25
Wire Rods, O. H., No. 5	6.25	....	6.15	6.15	6.45
Bright Common Wire Nails (‡)	6.85	....	6.75	6.60	6.95

*Book closed for 1960-61 shipping season. †Per 82 lb net reel. ‡Per 100-lb keg, 20d nails and heavier.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa. 21-23% Mn, $102.50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn $98. For Neville Island, Pa., prices add $2.50 as of Feb. 1. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Min 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.3c from above prices. For 3% grade, Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Deliveerd.

Charge Chrome: Cr 50-56%, C 6-8%, Si 4-7%, 22.00c; Cr 58-63%, C 5.8%, Si 3-6%, 22.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 53-63%, C 3-5%, Si 2.5% max, 26.00c per lb of contained Cr, delivered in carlots, lump, bulk.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 33.50c per lb contained Cr; 0.010% max, 34.50c. Delivered.

Cr, 65-71%, carload, lump, bulk, 0.025% max, 35.00c; 0.06% max, 34.00c; 0.10% max, 33.75c; 0.20% max, 33.50c; 0.50% max, 33.25c; 1.0% max, 33.00c; 1.5% max, 32.75c; 2.0% max, 32.50c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 24.50c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 24.50c per lb contained Cr, 14.60c per lb contained Si; 0.75 in. x down, 26.25c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, cariot packed, 2" x D plate (above ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETED ALLOYS

Chromium Briquets: (Weighing approx 3⅝ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb. (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50, (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-77% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20% per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

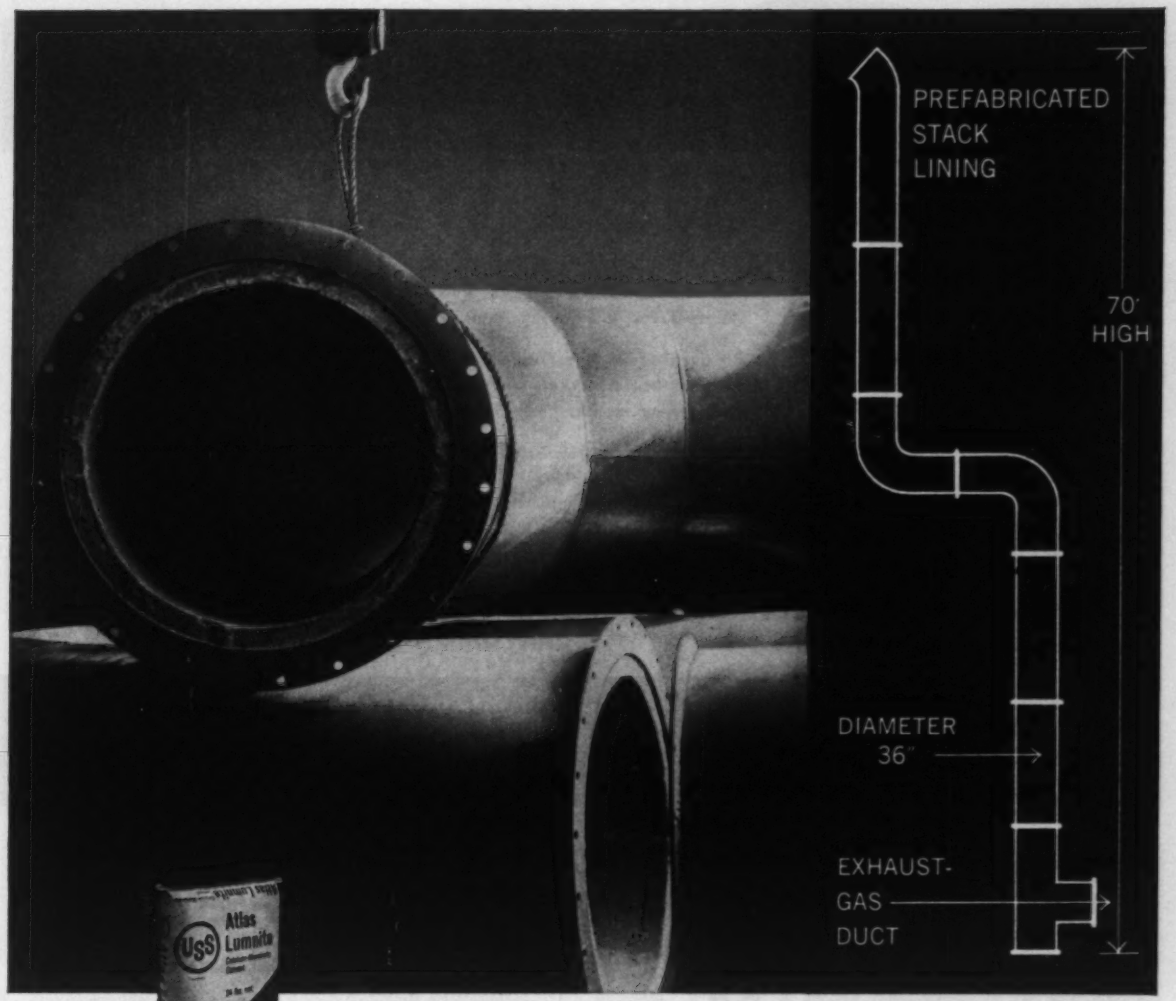
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.



Castable-lined prefab sections of waste-gas ducts and stacks for pit annealers at United States Steel's Homestead (Pa.) Works. **Contractor:** Amsler Morton Company, Pittsburgh, Pa.

Castable lining in prefab stacks reduces costs

When unusual stack and duct layouts are necessary, prefab elbows, tees, dog-legs and straights can be pre-lined with a refractory insulating concrete at considerable savings. Using a castable refractory, bonded with LUMNITE calcium-aluminate cement, monolithic linings can be cast in place without anchors or reinforcing mesh. Since the concrete will reach service strength in 24 hours, early release and re-use of forms are possible, speeding the job. Compared to cutting and fitting small refractory units, there is less material loss. Cluttered job sites and scaffolding are eliminated. And casting indoors means no delays due to weather. Leading manufacturers of refractories offer castables bonded with LUMNITE cement for a variety of installations in metalworking. Castables are packaged mixtures, ready to use. Simply add water, mix and place. For details, write Universal Atlas Cement, 100 Park Avenue, New York 17, N. Y.

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Scrap Prices Still Under Pressure

STEEL's composite on No. 1 heavy melting grade slips to $28.83 as new mill buying fails to develop and steelmaking operations waver in sluggish market

Scrap Prices, Page 166

● **Chicago**—Several leading grades of open hearth scrap are off $1 a ton on limited purchases by mills. Involved are No. 1 dealer heavy melting steel at $25, No. 2 heavy melting at $23, No. 1 dealer bundles at $26, and No. 1 railroad heavy melting at $29. Illustrating the weakness of the market, the price of No. 1 dealer heavy melting is $20 a ton below the $45 it commanded at the end of last year's steel strike, the lowest it has been since March, 1954. The all-time high price was $67 a ton in December, 1957. The current market weakness reflects the outlook for steelmaking the rest of this year.

● **Philadelphia**—Prices are off $1 a ton on No. 2 heavy melting steel to $29, delivered; on couplers, springs, and wheels to $38; and on rail crops (2 ft and under) to $47-$49. Major support for the steelmaking grades still comes from foreign buying, but export prices are easier. The cast iron grades are steady.

● **New York** — Although there's practically no domestic trading, brokers' buying prices are unchanged, following the general drop a week ago. Despite the approach of winter, Eastern consumers are showing no interest in building up stocks.

● **Cleveland**—Scrapmen don't anticipate much change in market conditions the rest of this year. With steelmaking operations failing to rise so far this quarter, dealers are becoming resigned to spotty demand. However, the increasing attractiveness of quoted prices, it's thought, may stimulate greater use of scrap as opposed to hot metal in the weeks ahead. Meanwhile, quoted prices are mostly nominal, with No. 1 heavy melting $23-$24 at Cleveland and $26-$27 in the Valley. A small lot of industrial No. 1 heavy melting went at $28 in the Valley, while a tonnage of No. 2 bundles was reported moved at $21.

● **Pittsburgh**—With district steelmaking operations scheduled at 47 per cent of capacity, the market continues weak. Prices of dealer grades are unchanged, but closing bids on railroad lists are off from $2.50 to $6 a ton. B&O Railroad sold 2000 tons of No. 1 heavy melting scrap at $31.50 a ton, the same price it was offered last month, when it refused to sell. In an earlier sale of the same grade, P&LE Railroad got only $27 a ton.

● **Detroit**—The market continues soft, with no trading or speculation expected following the election. Although dealers are hoping prices now have bottomed, brokers indicate there may be a further slide through the end of the year.

(*Please turn to Page* 173)

FOR SALE

One new Electric Arc Furnace Charging Bucket Including Bale
Type: Cable Operated—Clamshell
Capacity: 1486 Cu. ft. = 55 tons
Max Dia Closed: 17'-9"
Max Dia Opened: 18'-8"
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Distance from Eye of Bale to Bottom of Bucket Open and closed 14'-0"
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Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported in STEEL, Nov. 9, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Nov. 9	$28.83
Nov. 2	29.00*
Oct. Avg.	30.04
Nov. 1959	44.33
Nov. 1955	46.33

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, eastern Pennsylvania. *Revised.

PITTSBURGH

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	21.00-22.00
No. 1 dealer bundles	27.00-28.00
No. 2 bundles	20.00-21.00
No. 1 busheling	26.00-27.00
No. 1 factory bundles	30.00-31.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	11.00-12.00
Short turnings	15.00-16.00
Cast iron borings	15.00-16.00
Cut structurals:	
2 ft and under	33.00-34.00
3 ft and under	32.00-33.00
Heavy turnings	27.00-28.00
Punchings & plate scrap	34.00-35.00
Electric furnace bundles	31.00-32.00

Cast Iron Grades

No. 1 cupola	34.00-35.00
Stove plate	32.00-33.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	34.00-35.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	*29.00-30.00*
Rails, 2 ft and under	*45.00-46.00*
Rails, 18 in. and under	*46.00-47.00*
Random rails	*40.00-41.00*
Angles, splice bars	*36.00-37.00*
Railroad specialties	*35.00-36.00*
Rails, rerolling	*51.00-52.00*

Stainless Steel Scrap

18-8 bundles & solids	175.00-180.00
18-8 turnings	95.00-100.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	27.00-28.00
No. 1 hvy melt., dealer	*24.00-25.00*
No. 2 hvy melting	*22.00-23.00*
No. 1 factory bundles	29.00-30.00
No. 1 dealer bundles	*25.00-26.00*
No. 2 bundles	16.00-17.00
No. 1 busheling, indus.	27.00-28.00
No. 1 busheling, dealer	*24.00-25.00*
Machine shop turnings	11.00-12.00
Mixed borings, turnings	13.00-14.00
Shovel turnings	13.00-14.00
Cast iron borings	13.00-14.00
Cut structurals, 3 ft	30.00-31.00
Punchings & plate scrap	32.00-33.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Stove plate	30.00-31.00
Unstripped motor blocks	28.00-29.00
Clean auto cast	41.00-42.00
Drop broken machinery	41.00-42.00

Railroad Scrap

No. 1 R.R. heavy melt.	*28.00-29.00*
R.R. malleable	40.00-41.00
Rails, 2 ft and under	42.00-43.00
Rails, 18 in. and under	43.00-44.00
Angles, splice bars	37.00-38.00
Axles	48.00-49.00
Rails, rerolling	46.00-47.00

Stainless Steel Scrap

18-8 bundles, solids	160.00-165.00
18-8 turnings	90.00-95.00
430 bundles & solids	75.00-80.00
430 turnings	40.00-45.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	18.00-19.00
No. 2 heavy melting	13.00-14.00
No. 1 bundles	20.00-21.00
No. 2 bundles	10.00-11.00
No. 1 busheling	17.00-18.00
Machine shop turnings	6.50-7.50
Mixed borings, turnings	*7.00-8.00*
Shovel turnings	8.00-9.00

Cast Iron Grades

No. 1 cupola	29.00-30.00
Stove plate	23.00-24.00
Heavy breakable	22.00-23.00
Unstripped motor blocks	18.00-19.00
Charging box cast	23.00-24.00
Clean auto cast	34.00-35.00

CLEVELAND

No. 1 heavy melting	23.00-24.00
No. 2 heavy melting	19.00-20.00†
No. 1 factory bundles	27.00-28.00
No. 1 bundles	23.00-24.00
No. 2 bundles	16.00-17.00
No. 1 busheling	23.00-24.00
Machine shop turnings	10.00-11.00
Shovel turnings	14.00-15.00
Mixed borings, turnings	14.00-15.00
Cast iron borings	14.00-15.00
Cut foundry steel	28.00-29.00
Cut structurals, plate 2 ft and under	31.00-32.00
Low phos. punchings & plate	26.00-27.00
Alloy free, short shovel turnings	14.00-15.00
Electric furnace bundles	24.00-25.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Charging box cast	24.00-25.00
Heavy breakable cast	26.00-27.00
Stove plate	34.00-35.00
Unstripped motor blocks	28.00-29.00
Brake shoes	35.00-36.00
Clean auto cast	*42.00-43.00*
Burnt cast	*30.00-31.00*
Drop broken machinery	42.00-43.00

Railroad Scrap

R.R. malleable	*42.00-43.00*
Rails, 2 ft and under	45.00-46.00
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	38.00-39.00
Cast steel	32.00-33.00
No. 1 railroad cast	42.00-43.00
Railroad specialties	37.00-38.00
Angles, splice bars	36.00-37.00
Rails, rerolling	51.00-52.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	160.00-165.00
18-8 turnings	70.00-75.00
430 clips, bundles, solids	75.00-80.00
430 turnings	20.00-30.00†

YOUNGSTOWN

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	20.00-21.00
No. 1 busheling	26.00-27.00
No. 1 bundles	26.00-27.00
No. 2 bundles	*20.00-21.00*
Machine shop turnings	12.00-13.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Low phos.	27.00-28.00
Electric furnace bundles	27.00-28.00

Railroad Scrap

No. 1 R.R. heavy melt.	26.00-27.00

BUFFALO

No. 1 heavy melting	*23.00-24.00*
No. 2 heavy melting	*19.00-20.00*
No. 1 bundles	*23.00-24.00*
No. 2 bundles	*16.00-17.00*
No. 1 busheling	*23.00-24.00*
Shovel turnings	*13.00-14.00*
Machine shop turnings	*9.00-10.00*
Cast iron borings	*11.00-12.00*
Low phos. structurals and plates, 2 ft and under	*33.00-34.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	38.00-39.00
No. 1 machinery	45.00-46.00

Railroad Scrap

Rails, random lengths	*36.00-37.00*
Rails, 3 ft and under	*42.00-43.00*
Railroad specialties	*35.00-36.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	22.50-23.50
No. 2 heavy melting	19.50-20.50
No. 1 bundles	22.50-23.50
No. 2 bundles	15.00-16.00
No. 1 busheling	22.50-23.50
Machine shop turnings	8.00-9.00
Mixed borings, turnings	8.00-9.00
Shovel turnings	10.00-11.00
Cast iron borings	10.00-11.00
Low phos. 18 in.	31.00-32.00

Cast Iron Grades

No. 1 cupola	*34.00-35.00*
Heavy breakable cast	*28.00-29.00*
Charging box cast	34.00-35.00
Drop broken machinery	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	28.00-29.00
Rails, 18 in. and under	44.00-45.00
Rails, random lengths	36.00-37.00

PHILADELPHIA

No. 1 heavy melting	34.00
No. 2 heavy melting	*29.00*
No. 1 bundles	35.00
No. 2 bundles	19.00
No. 1 busheling	35.00
Electric furnabe bundles	36.00
Mixed borings, turnings	17.00†
Shovel turnings	19.00
Machine shop turnings	13.00
Heavy turnings	26.00†
Structurals & plates	37.00-39.00
Couplers, springs, wheels	*38.00*
Rail crops, 2 ft & under	*47.00-49.00*

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	37.00
Drop broken machinery	48.00-49.00
Malleable	46.00†

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	27.00-28.00
No. 2 heavy melting	18.00-19.00
No. 1 bundles	27.00-28.00
No. 2 bundles	13.00-14.00
Machine shop turnings	4.00-4.50†
Mixed borings, turnings	4.50-5.00†
Shovel turnings	6.00-7.00†
Low phos. structurals & plates	31.00-32.00†

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	23.00-24.00
Heavy breakable	28.00-29.00

Stainless Steel

18-8 sheets, clips, solids	150.00-155.00
18-8 borings, turnings	75.00-80.00
410 sheets, clips, solids	50.00-55.00
430 sheets, clips, solids	60.00-65.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	23.00-24.00
No. 2 heavy melting	19.00-20.00
No. 1 bundles	23.00-24.00
No. 1 busheling	23.00-24.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	30.00-30.50
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	*28.00-29.00*
No. 2 bundles	20.00-21.00
No. 1 busheling	29.00-30.00
Cast iron borings	10.00-11.00
Machine shop turnings	17.00-18.00
Shovel turnings	19.00-20.00
Bar crops and plate	36.00-37.00
Structurals & plate	36.00-37.00
Electric furnace bundles	*30.00-31.00*
Electric furnace:	
3 ft and under	33.00-34.00
2 ft and under	34.00-35.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	45.00-46.00
Unstripped motor blocks	33.00-34.00
No. 1 wheels	34.00-35.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	39.00-40.00
Angles, splice bars	37.00-38.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	28.00
No. 2 heavy melting	26.00
No. 1 bundles	30.00
No. 2 bundles	19.00
No. 1 busheling	30.00
Machine shop turnings	7.50
Shovel turnings	9.50

Cast Iron Grades

No. 1 cupola	*39.00*
Charging box cast	*34.00*
Heavy breakable cast	*32.00*
Unstripped motor blocks	*34.00*
Clean auto cast	*39.00*
Stove plate	*34.50*

Railroad Scrap

No. 1 R.R. heavy melt.	*29.00*
Rails, random lengths	35.00
Rails, rerolling	*45.00*
Rails, 18 in. and under	*37.00*
Angles, splice bars	*33.00*

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	33.00
No. 2 heavy melting	29.00
No. 1 bundles	32.00
No. 2 bundles	20.00
Machine shop turnings	nom.
Low phos. plate & structurals:	
3 ft	35.00
2 ft and under	37.00-38.00

Cast Iron Grades

No. 1 cupola	34.00-34.50
Heavy breakable	25.00
Foundry malleable	29.00-30.00†
Unstripped motor blocks	28.00-28.50

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00

LOS ANGELES

No. 1 heavy melting	*29.00**
No. 2 heavy melting	*26.00**
No. 1 bundles	*25.00†*
No. 2 bundles	*17.00**
Machine shop turnings	*11.00†*
Shovel turnings	*12.00†*
Cast iron borings	*12.00†*
Cut structurals and plate 1 ft and under	*41.00†*

Cast Iron Grades

No. 1 cupola	*38.00-39.00†*

Railroad Scrap

No. R.R. heavy melt.	*33.00†*

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	39.00
No. 2 heavy melting	36.00
No. 2 bundles	21.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable	33.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	20.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	38.50
No. 2 (prepared for shears)	30.00
No. 1 hvy (unprepared)	35.00
No. 2 heavy melting	35.50
No. 2 hvy (unprepared)	33.00
No. 1 (prepared for shears)	33.00
No. 2 bundles	23.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable cast	36.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	20.00

SAN FRANCISCO

No. 1 heavy melting	32.00
No. 2 heavy melting	29.00
No. 1 bundles	27.00-28.00
No. 2 bundles	18.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	46.00-48.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

No. 1 heavy melting	25.80
No. 2 hvy melt, 2 ft & under	25.50
No. 1 bundles	25.80
No. 2 bundles	19.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Busheling, new factory:	
Prepared	25.50
Unprepared	20.45
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	43.00

*For export add $4 dock charges.
†Nominal.
‡F.o.b. Hamilton, Ont.

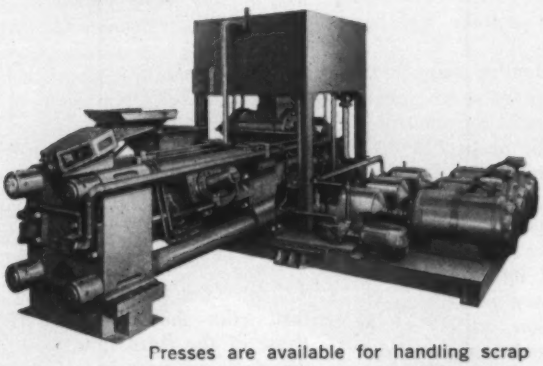
the all-new MILWAUKEE BRIQUETTING PRESS

8818-SI

Chips, turnings and borings are converted rapidly and economically into dense cylindrical briquettes that are classified as high grade scrap.

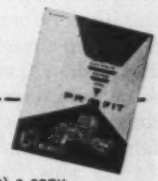
converts scrap into PROFIT!

Briquetting is a proved and practical method of salvaging almost every type of machine shop scrap. Savings are realized in three major ways. (1) Metal loss is reduced to a minimum . . . AND your up-graded scrap recovery value is like money in your pocket. (2) Working and storage areas throughout your entire plant can be put to better use. (3) Quality and production control profit because you can re-use non-contaminated metals of known analysis.



Presses are available for handling scrap volumes from ¾ to more than 9 tons per hour. Milwaukee engineers will evaluate your individual requirements.

Just off the press . . . Bulletin BP-217 is yours for the asking. Complete with specifications, illustrations and photos.



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MILWAUKEE *Foundry Equipment Division*

Aluminum Sales May Double by '70

Nonferrous Metal Prices, Pages 172 & 173

FREE WORLD consumption of primary aluminum will more than double by 1970 if the latest industry forecast holds up. Kaiser Aluminum & Chemical Corp. sees usage by the free nations rising to 7,438,000 tons in the next decade compared with an estimated 1960 consumption of 3,619,000 tons (see table). The Soviet Bloc should also sharply step up usage—from 1,040,000 tons in 1960 to 2,750,000 tons in 1970.

Primary Aluminum World Consumption Set to Spurt

(Thousands of tons)

	1958	1960	1965	1970
North America	1,558	2,210	3,275	4,365
Latin America	83	94	172	293
Common Market	482	560	819	1,257
Other Europe	399	481	657	854
Mid-East & Africa	28	29	40	55
Asia & Oceania	182	245	412	614
Free World	2,732	3,619	5,375	7,438
Soviet Bloc	685	1,040	1,780	2,750
Total World	3,417	4,659	7,155	10,188

Source: Kaiser Aluminum & Chemical Corp.
(Does not include secondary metal.)

• **More Per Person**—One of the key factors in projecting aluminum's potential market is the differential between annual per capita consumption in the U. S. and the rest of the Free World, believes Kaiser. This year, U. S. per capita usage will be about 22.4 lb. Yet, even the highly industrialized nations of the Common Market will use a scant 6.7 lb per person; the other free European nations 6.2 lb; Latin America 1 lb; Asia and Oceania 0.7 lb; the Mid-East and Africa 0.2 lb.

In 1970, per capita consumption should stack up like this, forecasts Kaiser: U. S. 36 lb; Common Market 14.1 lb; other free European nations 10.1 lb; Latin America 2.6 lb; Asia and Oceania 1.3 lb; the Mid-East and Africa 0.3 lb.

• **Capacity Needed**—If the projections are realized, the Free World will be consuming 70 per cent more metal by 1970 than it could produce (primary capacity) today. Supply is already tight in many parts of the Free World, as evidenced by the sharp upswing in U. S. exports this year. Through August, crude aluminum exports totaled 209,472 tons, quadruple the 1959 rate. Semifabricated shape exports were at 14,035 tons, double those of the same period of last year. And scrap exports tripled to 53,374 tons.

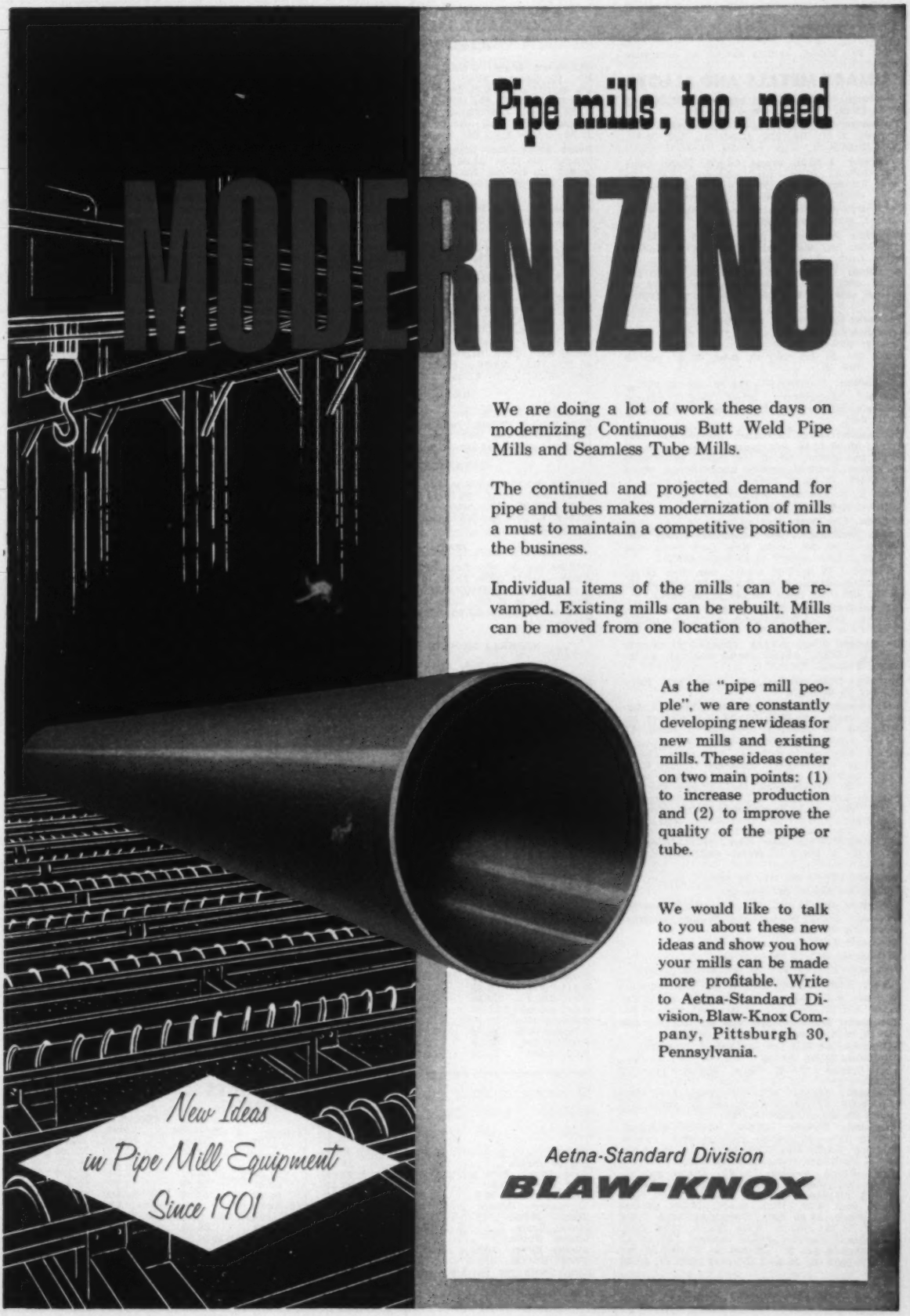
Free World primary capacity is 4,459,000 tons. Three-quarters of that figure, and the bulk of present overcapacity, is in North America. The U. S. has a capacity of 2.4 million tons and is presently operating at around 80 per cent. Canada has a capacity of 878,000 tons—and is also operating at around 80 per cent. The U. S. has an additional 220,000 tons of partially installed capacity; Canada has 90,000.

Secondary production will take up some of the slack between present primary capacity and the amount of metal that will be needed by 1970 because the generation of scrap, particularly old scrap, will become an increasingly potent force on the aluminum scene. Nevertheless, the Free World will have to install a lot of new capacity in the next ten year (1.5 million to 2 million tons) if the forecast is to be met.

In the Markets

• **The Zinc Situation** — Producers say they've seen a little pickup in orders for special high grade, but the improvement is believed to be more of a reflection of strikes that have closed down two producers than any demand upswing. Shipments of slab zinc in October fell 3000 tons to 65,183 tons, reports the American Zinc Institute. In the first ten months, shipments totaled 697,986 tons compared with 724,994 tons in the same period of 1959. Smelter output through October was 733,855 tons, up a little from the 726,008 ton total registered in 1959's like period. At the first of this month, smelter stocks stood at 190,288 tons, just about where they were at this time last year. November demand should end up about the same as that for October.

• **Lead Sales Gain**—Fourth quarter lead sales should be better than those of the third quarter, but indications are the gain will be small. In September, deliveries of refined lead in the U. S. were down about 8000 tons. For the first nine months, U. S. deliveries of primary lead totaled 422,438 tons compared with 517,331 tons in the same period of 1959, says the American Bureau of Metal Statistics.



Pipe mills, too, need MODERNIZING

We are doing a lot of work these days on modernizing Continuous Butt Weld Pipe Mills and Seamless Tube Mills.

The continued and projected demand for pipe and tubes makes modernization of mills a must to maintain a competitive position in the business.

Individual items of the mills can be revamped. Existing mills can be rebuilt. Mills can be moved from one location to another.

As the "pipe mill people", we are constantly developing new ideas for new mills and existing mills. These ideas center on two main points: (1) to increase production and (2) to improve the quality of the pipe or tube.

We would like to talk to you about these new ideas and show you how your mills can be made more profitable. Write to Aetna-Standard Division, Blaw-Knox Company, Pittsburgh 30, Pennsylvania.

Aetna-Standard Division

BLAW-KNOX

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 31.50; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 26.25-26.75, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.60 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55 per lb and up nom.

Copper: Electrolytic, 30.00 deld.; custom smelters, 30.00; lake, 30.00 deld.; fire refined, 29.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis. New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld.; 24-99 lb, $9.50; 100-499 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $208-210 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-8.5 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $45-50 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $3.50-5 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot, 104.00; prompt, 103.25.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.85 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.10-4.00.

Zinc: Prime western, 13.00; brass special, 13.25; intermediate, 13.00. East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 14.35; special high grade, 14.50 deld. Diecasting alloy ingot No. 3, 16.25; No. 2, 16.75; No. 5, 16.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8-8.50 per lb; 100-500 lb, $7.25-7.50 per lb, 500-1000 lb, $6.50-7.25; over 1000 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 25.00-26.00; No. 12 foundry alloy (No. 2 grade), 22.75; 5% silicon alloy, 0.60 Cu max., 24.00; 13 alloy, 0.60 Cu max., 24.00; 195 alloy, 25.75; 108 alloy, 23.25. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 22.50; grade 3, 21.50; grade 4, 21.00.

Brass Ingot: Red brass, No. 115, 28.25; tin bronze, No. 225, 38.00; No. 245, 32.50; high-leaded tin bronze, No. 306, 32.75; No. 1 yellow, No. 405, 23.50; manganese bronze, No. 421, 27.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.945, f.o.b. temple, Pa., or Reading, Pa.; rod, bar, wire, $1.945, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 35.35; l.c.l., 35.98. Weatherproof, 20,000-lb lots, 36.30; l.c.l., 37.05.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $14.00-22.90; C.R. strip, $16.00-35.00; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24-72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-114	54.60
0.011-0.0095	24-46	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 base, 12 ft lengths

Diam	Round		Hexagonal	
(in.)*	2011-T3	2017-T4	2011-T3	2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.60
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.50	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.50-24.00; No. 2 heavy copper and wire, 21.75-22.25; light copper, 19.25-20.25; No. 1 composition red brass, 18.50-19.00; No. 1 com-

BRASS MILL PRICES

MILL PRODUCTS a

	Strip, Plate	Rod	Wire	Seamless Tubes
Copper	55.13b	52.36c	....	56.32
Yellow Brass	49.27	34.88d	49.56	53.43
Low Brass, 80%	51.75	51.69	52.04	55.81
Red Brass, 85%	52.62	52.56	52.91	56.68
Com. Bronze, 90%	54.03	53.97	54.32	57.84
Manganese Bronze	57.77–57.82	51.42–51.46	61.69	....
Muntz Metal	52.14	47.45	....	....
Naval Brass	54.08	47.89	60.39	58.24
Silicon Bronze	60.45–60.48	59.64–59.67	59.74–59.77	78.89
Nickel Silver, 10%	64.68	67.01	66.76	....
Phos. Bronze, A-5%	75.70	76.20	75.45–75.70	77.63

SCRAP ALLOWANCES e (Based on copper at 30.00c)

	Clean Heavy	Rod Ends	Clean Turnings
Copper	26.000	26.000	25.250
Yellow Brass	20.375	19.625	18.625
Low Brass, 80%	22.500	22.250	21.750
Red Brass, 85%	23.250	23.000	22.500
Com. Bronze, 90%	24.000	23.750	23.250
Manganese Bronze	19.250	19.000	18.375
Muntz Metal	19.475	19.125	18.625
Naval Brass	19.125	18.875	18.375
Silicon Bronze	25.500	25.250	24.500
Nickel Silver, 10%	25.125	24.875	12.562
Phos. Bronze, A-5%	27.125	26.875	25.875

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 17.50-18.00; new brass clippings, 16.00-16.50; light brass, 13.00-13.50; heavy yellow brass, 14.00-14.50; new brass rod ends, 15.00-15.50; auto radiators, unsweated, 14.25-14.75; cocks and faucets, 15.75-16.25; brass pipe, 16.50-17.00.

Lead: Soft scrap lead, 7.75-8.00; battery plates, 3.00; linotype and stereotype, 9.00-9.50; electrotype, 8.00-8.25; mixed babbitt, 9.50-10.00.

Monel: Clippings, 23.00-24.00; old sheets, 22.00-23.00; turnings, 16.50-17.50; rods, 22.00-23.00.

Nickel: Sheets and clips, 50.00-51.00; rolled anodes, 50.00-51.00; turnings, 39.00-41.00; rod ends, 50.00-51.00.

Zinc: Old zinc, 3.00-3.50; new diecast scrap, 4.25-4.50; old diecast scrap, 2.75-3.00.

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 6.00-6.50; segregated low copper clips, 13.00-13.50; segregated high copper clips, 12.00-12.50; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 10.00-10.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 13.50-14.00; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.00; clean borings and turnings, 8.50; segregated low copper clips, 14.00; segregated high copper clips, 13.00; mixed low copper clips, 13.00; mixed high copper clips, 12.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 56.00; light scrap, 51.00; turnings and borings, 36.00.

Copper and Brass: No. 1 heavy copper and wire, 24.50; No. 2 heavy copper and wire, 22.50; light copper, 20.50; refinery brass (60% copper) dry copper content, 21.25.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 24.50; No. 2 heavy copper and wire, 22.50; light copper, 20.50; No. 1 composition borings, 19.50; No. 1 composition solids, 20.50; heavy yellow brass solids, 15.00; yellow brass turnings, 14.00; radiators, 16.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.

Copper: Flat-rolled, 47.04; oval, 43.50 5000-10,000 lb; electrodeposited, 39.00, 2000-5000 lb lots; cast, 41.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 122.50; 200-499 lb, 121.00; 500-999 lb, 120.50; 1000 lb or more, 120.00.

Zinc: Balls, 20.50; flat tops, 20.50; flats, 23.25; ovals, 22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.25; 2000-5900 lb, 13.25; 6000-11,900 lb, 13.00; 12,000-22,900 lb, 12.75; 23,,000 lb or more, 12.25.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 80.60; 100-600 lb, 71.20; 700-1900 lb, 68.40; 2000-9900 lb, 66.60; 10,000 lb or more, 65.20.

Stannous Chloride (Anhydrous): 25 lb, 156.20; 100 lb, 151.40; 400 lb, 148.90; 800-19,900 lb, 108.00; 20,000 lb or more, 102.00.

Stannous Sulphate: Less than 50 lb, 141.30; 50 lb, 111.30; 100-1900 lb, 109.30; 2000 lb or more, 107.30.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 167*)

• **Buffalo**—A sharp price break developed in the market here, carrying some grades down as much as $4 a ton. The biggest declines were in leading mill grades and railroad scrap. Turnings also were cut sharply, and cast scrap items are down slightly. A bearish factor is the report that the leading consumer here does not plan to make any purchases for November delivery. Supplies are building up in dealers' yards.

• **Cincinnati** — Prices on the cast iron grades have declined with the slump in quotations on steelmaking scrap. The market has virtually dried up. No. 1 heavy melting is unchanged at $22.50-$23.50, brokers' buying price, the lowest level quoted in years.

• **St. Louis**—A large railroad list came out last week, offering more tonnage than demand could absorb. As a result, rail scrap prices slumped $1 to $3 a ton. Cast iron grades also are off $1 a ton, except stove plate which went down $1.50. Prospects for a turn in the market are not promising.

• **Birmingham**—No. 1 bundles are quoted off $1 to $28-$29. Electric furnace bundles are similarly off, at $30-$31. Those are the only price changes in the current sluggish market. However, dealers say no orders are coming in, and they report some shading of prices below the publicly quoted levels.

• **Houston** — The market is weak but is getting a little support as a result of exports to Mexico and elsewhere. While the prices are higher in the Southwest than in several other areas, they are still not high enough to attract scrap. Supplies are low.

The export price for steel scrap delivered to the dock is about $1 above the domestic price. Mexican buyers are paying about 50 cents over the domestic level for scrap delivered at the border.

• **Los Angeles**—Dealers have reduced prices $1 a ton across the board in an effort to get sales going. All prices are nominal, except those on No. 1 and No. 2 heavy melting, and No. 2 bundles which are in demand on export account. Dealers are not optimistic, some of them anticipating a further pricedrop.

• **Portland, Oreg.**—Prices are unchanged, but the market is weak and lower prices are expected to develop. The local mill is buying as needs arise, but, generally, demand is inactive. Some support is coming from the export section. Local shippers are loading a full cargo for delivery to Japan, and another 9000 ton shipment is being arranged for December. Stockpiling for those shipments is underway.

• **San Francisco**—With steel production up slightly in this area, consumption of scrap is heavier. Scrap prices have not changed, however, since no increase in buying is reported.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 163

Production of coke in September totaled 3,651,661 net tons (3,591,515 oven coke, 60,146 beehive), reports the U. S. Bureau of Mines. It compares with 3,996,922 tons (3,923,408 oven and 73,514 beehive) in August, this year, and 1,775,200 tons (1,738,900 oven and 36,300 beehive) in August last year.

Output in the first nine months this year was 46,099,326 tons (45,299,879 oven and 799,447 beehive), compared with 43,511,600 tons (42,633,700 oven and 877,900 beehive) in the same period of 1959.

Producers' stocks of oven coke at

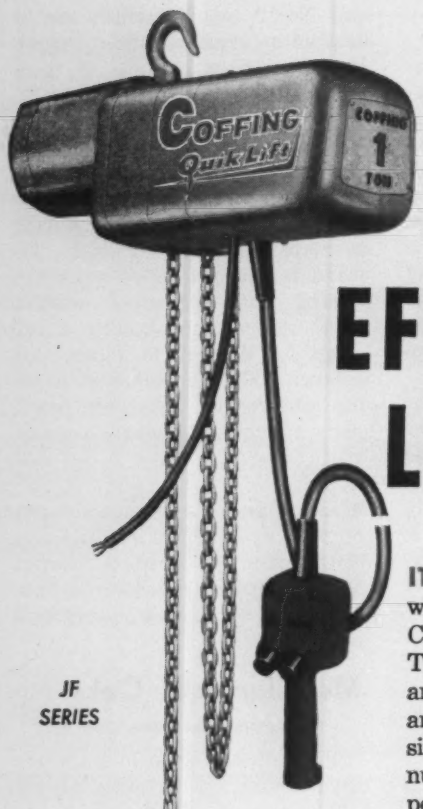
CLASSIFIED

Help Wanted

SALESMAN WANTED — MIDWEST METAL ABRASIVE Company desires salesman between age of 20 and 30 to sell metal industry in New Jersey, eastern Pennsylvania and Maryland. Commission, car and expenses. Furnish background. Interview will be arranged. Reply to Box 879, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

Purchasing Manager in Midwest wants to relocate with small to medium size organization in West Pennsylvania—East Ohio area. Formerly purchased in Pittsburgh area. Top performance record, qualifications and references in Material Management, Purchasing, Inventory Control, Estimating, Value Analysis, Traffic, College—Accounting Major. Age 42. 14 years supervisory capacity in both light and heavy industry. All material and capital equipment. Reply to Box No. 881, STEEL, Penton Bldg., Cleveland 13, Ohio.



JF SERIES

EASY SAFE EFFICIENT LIFTING!

IT'S EASY to raise or lower loads while pulling a trolley mounted Coffing Quik-Lift Electric Hoist. The pistol-grip control station and the combination strain cable and control cord makes this possible. The light but strong aluminum housing provides ease of portability. Changing voltages, limit switch, type of suspension or chain is quick because the housing is in sections.

FOR SAFETY the control station is made of non-conducting plastic in which the voltage is reduced to 115 volts and the push-buttons are interlocked. The V-type brake which provides maximum braking surface and positive control of loads is another safety measure.

FOR EFFICIENCY this hoist has been designed to bring heavy-duty performance plus durability to the portable hoist field. It will pay you to specify Coffing Quik-Lift. Twenty models—capacities range from ¼ to 2 tons. Ask your distributor for details or write for Bulletin ADH-65.

COFFING HOISTS

DUFF-NORTON COMPANY

Four Gateway Center · Pittsburgh 22, Pa.

COFFING HOISTS
Ratchet Lever • Air
Hand Chain • Electric

DUFF-NORTON

DUFF-NORTON JACKS
Ratchet • Screw
Hydraulic • Worm Gear

the end of September totaled 4,452,020 tons, equal to 37.2 days' production. That compares with 4,488,302 tons, 28.7 days' production, on the same date a year ago.

Pig Iron . . .

Pig Iron Prices, Page 162

Merchant iron is moving more slowly than it was a couple of weeks ago.

The normal seasonal upturn in orders for castings has not materialized. Foundries are limiting purchases of iron to cover immediate needs.

Some pipe shops in the Birmingham district have reduced operations to four days a week and look for even slower activity during the next three or four months, when the construction industry experiences its seasonal lag. The low point will likely be reached during the Christmas holiday week.

Tin Plate . . .

Tin Plate Prices, Page 159

American Can Co., New York, plans to post new and slightly higher prices on tin cans for 1961. The new schedule will be issued around Dec. 1 and will reflect higher costs. The prices will be firm throughout 1961 except for any increases in the price of tin plate and further rise in freight costs. Separate prices will be established at each plant of the company. Early this year, some can prices were advanced and others reduced.

Distributors . . .

Prices, Page 162

Steel service centers are receiving a steady flow of business, but the volume is unseasonally low. They are being hurt by competition with mills which are offering quick delivery on most products. Distributors see no change for the better in the offing.

Most users are buying hand to mouth from service centers and are shopping for price concessions. A major distributor in Houston says the foreign price on round bars, angles, and flat bars has dropped slightly.

There's little talk about the possibility of a price hike on domestic material next month, but some fabricators may be hedging.

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HARD FACTS ABOUT "COLD BEANS" FROM RYAN
If you want your Beans to remain cold, RYAN's engineers can give you the Hard Facts. Let the RYANSTALK assist on your competitive climb by furnishing you with reliable CRYOGENIC equipment. ❦ RYAN's engineering, manufacturing and production experience will eliminate your CRYOGENIC problems as effectively as Jack handled the Giant. ❦ Versatility of design is demonstrated by a complete line from portable 30 gallon units to 11,400 gallon liquefied gas storage stations including either ambient, electrical or steam vaporizers with capacities from 15 SCFH to 50,000 SCFH. ❦
Rely on Ryan
RYAN
Industries, Inc.
CRYOGENIC DIVISION
DEPARTMENT D
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☐ Have Sales Engineer Call
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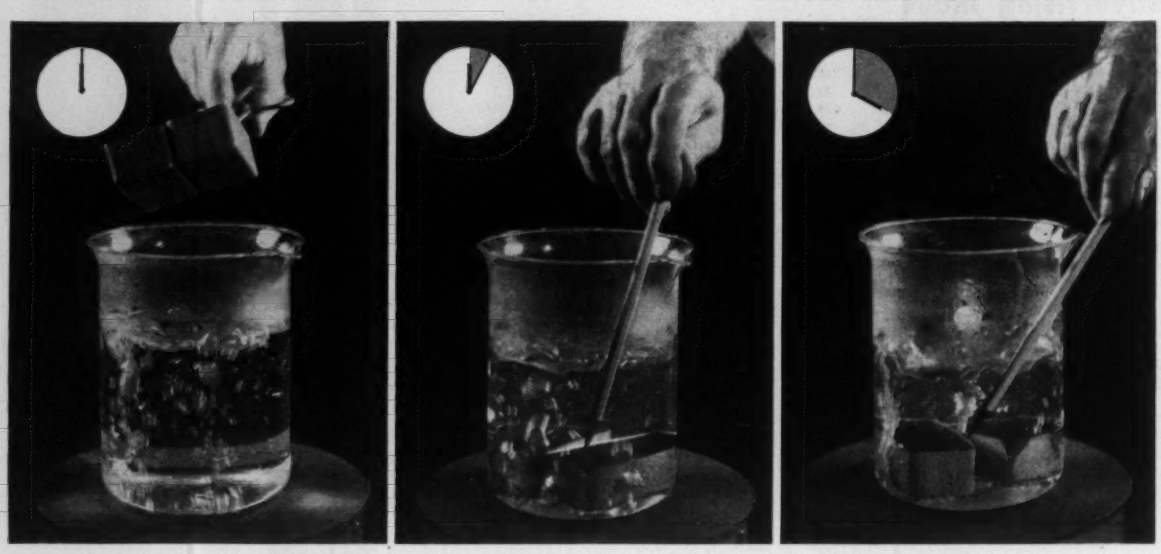
Company
Address
City
State

A DRAMATIC DEMONSTRATION OF THE NEW CLAD-REX 102 LAMINATE



Boiling water provides a positive test for two deep drawn* vinyl-clad parts. Neither special care in forming, nor post curing has been used to prepare either part.

Almost within a matter of seconds, the part formed of conventional vinyl-clad metal (at right) begins delaminating at the corners.

Even after as long as four hours of boiling, the part formed of new Clad-Rex 102 laminate (at left) still shows no delamination whatsoever.

New Clad-Rex vinyl-clad metal sharply reduces limitations in deep drawing and heat exposure

Has your interest in vinyl-clad metals been cooled because your product is deep drawn? . . . or because your product is exposed to elevated temperatures? . . .

Now, you can solve the problem with new Clad-Rex 102. It's a new vinyl-metal laminate that is, in effect, a single element of material. Clad-Rex 102 combines *for the first time* the ultimate properties of sheet metal with the optimum characteristics of vinyl.

Call or write for facts of this major technological breakthrough by the extensive research laboratories of Simoniz Company.

*Depth of draw equal to six times radius of corner

VINYL-METAL LAMINATES BY **CLAD-REX**® DIVISION OF SIMONIZ COMPANY

11504 W. King Street • Franklin Park, Illinois

Telephone: GLadstone 1-2323

22C

SIMONDS ALL-NEW SUPER HIGH SPEED STEEL METAL BAND SAW

This ALL-NEW SUPER HIGH SPEED STEEL Band Saw Blade

comes welded-to-length . . . ready to use . . . in striking, new package with cutting edges protected by a special plastic cover.

Industry reports nothing else compares for cutoff production

The biggest advance ever in metal cutting band saw blades — that's Simonds *SUPER* High Speed Steel Metal Band Saw. No matter what ferrous metal you're band sawing, this brand new blade will give you *up to 3 times better performance* than any High Speed Steel blade you're now using!

This is not just a claim but a provable fact backed by Simonds' established reputation as a leading manufacturer of industrial cutting tools.

This *SUPER* High Speed Steel Band is an entirely new concept in band saws . . . new steel*, new manufacturing methods, new heat treatment, new welding techniques, new final inspection.

Laboratory and field tests demonstrate that this new saw is so much better in every way for production cut-off work that we are offering it on a PERFORMANCE GUARANTEED basis! You can't lose — you can cut your blade costs, save on down time, get the equivalent of up to 3 saws in better performance *at a cost of only 10% more than ordinary High Speed Steel blades.*

The sooner you try this new blade, the more you'll save! Get prompt delivery now of Simonds *SUPER* High Speed Steel Band through your Simonds Industrial Supply Distributor or your nearest Simonds Branch.

*Developed and made in Simonds own Steel Mill — Patent Applied For

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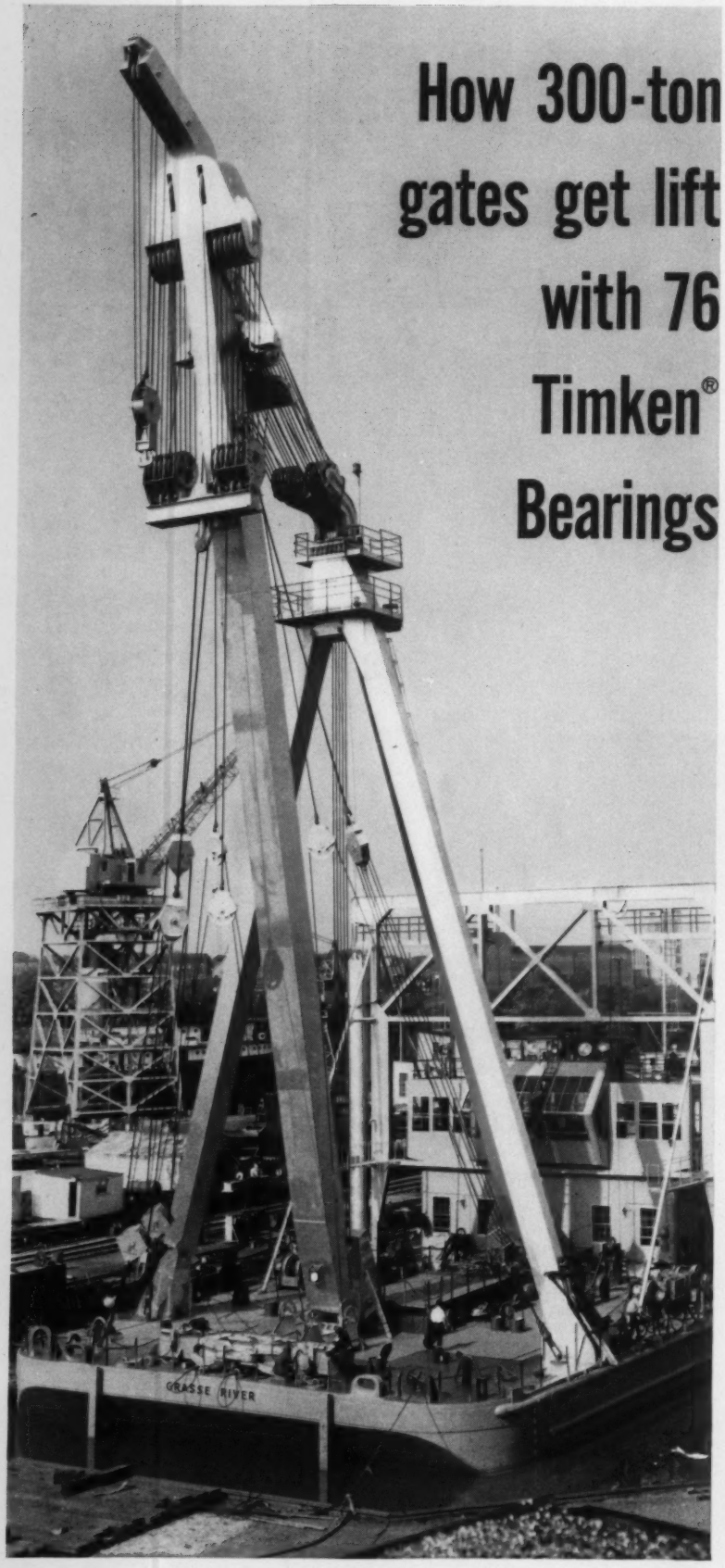
How 300-ton gates get lift with 76 Timken® Bearings



Here's a lift job to make your eyes pop. This gate lifter barge hoists the St. Lawrence Seaway's 300-ton lock gates for maintenance work. Strain is great on the 72 hoisting sheaves. To take it, McKissick Products Co. of Tulsa, Okla., the sheave builders, mounted them on Timken® tapered roller bearings. Sheaves were installed by the American Ship Building Co. of Cleveland, O. And a Timken bearing is used in the main hook thrust position to support the entire 300-ton load. Timken bearings are also used in the derrick head-Rooster.

The tapered design of Timken bearings lets them take all the loads, *both* radial *and* thrust. Maximum sheave rigidity and accurate sheave alignment are provided by the TDO type sheave bearings with their built-in, large, effective bearing spread distances. And because of Timken bearings' true rolling motion, sheaves turn easily, dependably, even under heavy overloads.

SERVICE THAT SAVES YOU TIME AND MONEY. Our graduate engineer salesmen can solve your bearing problems on the spot—right at the design stage.

The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO." Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits. Canadian Division: Canadian Timken, St. Thomas, Ont.

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